Local Indigenous Biodiversity Strategy (LIBS) Pilot Project: Source to the Sea

Source to the Sea
Te Puna o Waihou ki Tīkapa te Moana
Restoring nature, connecting communities

Waikato
REGIONAL COUNCIL
Te Kaunihera ā Rohe o Waikato
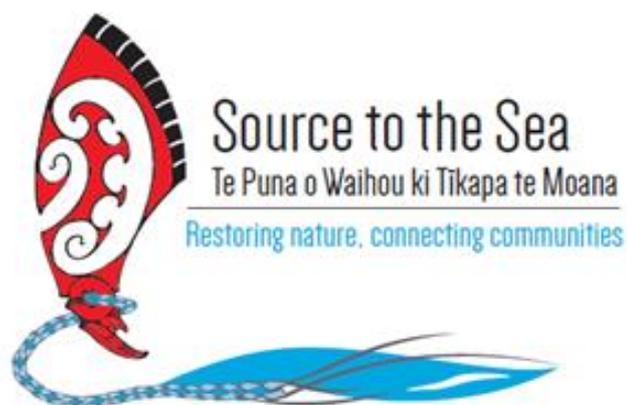
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1 Executive summary

The natural environment is fundamental to our well-being, health and economy. It provides us with a range of benefits – ecosystem services (ES) including food, water, materials, flood defences and carbon sequestration – and biodiversity underpins most, if not all, of them. The success of the Waikato economy is intricately linked to its natural resources and ES provided by the environment.

Enhancing biodiversity and restoring ecosystem processes in agricultural and urban landscapes is at the "cutting-edge" of biodiversity management. This is particularly relevant in the Waikato Region where agricultural development has led to extensive habitat loss and modification.

Increasing agricultural productivity is seen as good for the local economy while at the same time, reducing on-farm environmental footprint is seen as good for the environment and people's wellbeing. On the ground examples of how to manage these two seemingly conflicting messages through holistic approaches to biodiversity management is a significant opportunity for the region.

Biodiversity management is a multi-faceted undertaking and is the responsibility of many public agencies, private landowners and business/sector groups. While co-operative approaches involving key stakeholders offer important opportunities, facilitating and co-ordinating collaborative efforts also present major challenges.

For biodiversity, this need and its associated opportunities have been recognised via the Regional Policy Statement (RPS) Method 11.1.11, Local Indigenous Biodiversity Strategy (LIBS). Undertaking LIBS is embedded into our statutory framework through the RPS and is the key method for responding to significant regional resource management issues of ongoing biodiversity decline.

Biodiversity management at a landscape scale, focussed on a network of interconnected natural areas that are managed in a co-ordinated way, builds on lessons learned from Integrated Catchment Management (ICM) and other projects elsewhere, and reflects Waikato Regional Council (WRC)'s past activities and growing interest in managing whole catchments in a more integrated way.

Historically, catchment management plans (CMPs) have been primarily directed at improving water quality and reducing sediment. However, recently CMPs focus on a broader suite of habitats, ecological processes and species. This makes the Source to the Sea pilot (the pilot) an important and timely initiative as its holistic view can help feed into CMPs. This project (Local Indigenous Biodiversity Strategies, or 'LIBS') will augment biodiversity conservation activities already underway in the upper Waihou, as well as other landscape-scale projects in the region.

This shift in emphasis from previous biodiversity approaches necessitated a step-wise progression into the LIBS programme via a pilot project. The ability to test the LIBS model at a smaller scale, and then scale it up based on lessons-learned was considered a good investment and a prudent approach, as was learning by doing and sharing the findings with others.

The LIBS Pilot Project – Source to the Sea: Te Puna o Waihou ki Tikapa te Moana – had as its purpose:

> *To test and share results of/learnings from landowner and marae-based engagement, and ecological network modelling in order to demonstrate the benefits of taking a strategic and co-operative approach to biodiversity management in a timely manner that transitions effectively into the LIBS programme.*

Since the initiation of the pilot in October 2015, the pilot has:

- Confirmed the ability to model and map ecological networks at catchment and zone scale, and apply this work to enable more proactive and strategic approaches to working with others and to prioritise resources.

- Highlighted areas where existing monitoring can be built on to align citizen science and Mātauranga Māori approaches, areas where monitoring needs to be strengthened to enable appropriate monitoring of progress (terrestrial ecosystem health and biodiversity indicators) and ongoing alignment with existing work around development of an ES monitoring framework.

- Identified key partners and invest in the relationships necessary to engage them and to build their capacity to be involved in biodiversity management.

- Undertaken effective landowner engagement and community network mapping to better understand needs and aspirations and the location and scale of biodiversity activity on the ground.

- Undertaken on-farm modelling (farm optimisation) to demonstrate that increased farm performance is achievable alongside biodiversity restoration and management.

- Undertaken an approach to engage effectively at the marae level to better understand the needs and aspirations of marae and their ongoing relationship with indigenous biodiversity and how these resources can be effectively co-managed into the future.

- Provide a framework that can improve co-ordination of existing biodiversity activity (both within WRC and across other agencies and stakeholders), highlight any duplication or gaps in management that need to be addressed, and identify opportunities for collaboration to achieve greater gains for biodiversity and regional wellbeing.

- Identify a proposed work programme and potential funding model that transitions the pilot project into the LIBS programme, extends the Source to the Sea kaupapa, and provides a potentially extended funding and resource base to deliver a co-ordinated on-the-ground effort.

With its focus on addressing strategic capacity needs, including improved understanding of ecosystem processes, enhanced biodiversity management ability and stronger working partnerships, the Source to the Sea pilot constitutes a timely opportunity for WRC to improve its ability to meet its obligations, to test its philosophy of working with others, and to support a growing family of partners with similar interests and complementary capacities.

Undertaking the Source to the Sea pilot has significantly advanced our ability to undertake such an approach successfully.

Outline of this report

This report provides an overview of the LIBS Pilot Project – Source to the Sea – Te Puna o Waihou ki Tikapa te Moana: Restoring nature, connecting communities.

The purpose of this report is to:

1. Provide the context for the LIBS pilot and programme.
2. Provide an overview of the work completed as part of the pilot and what we have learned from it.
3. Provide an indication of where and how we will implement the LIBS programme.

The document is structured in nine parts as follows:

PART 1: Setting the scene

Part one includes the executive summary. This sets out the background to the pilot, provides a line of sight from the Resource Management Act (RMA) to the RPS biodiversity chapter, other key linked RPS directions and WRC strategic direction.

PART 2: LIBS programme and pilot overview

Part two describes the relationship between the LIBS programme and the LIBS pilot and provides a step-wise progression from the RPS method via the LIBS pilot into the LIBS programme.

PART 3: The LIBS pilot – how did we do it?

Part three outlines how the pilot project was set up and structured, including project scope, governance, communications and stakeholder register.

PART 4: Project governance

Part four details the project structure and explains the internal governance group and the external advisory group.

PART 5: Communications plan and stakeholder register

Part five explains communications for the project and identified stakeholders.

PART 6: How did we engage?

Part six highlights the processes used to engage with landowners and mana whenua. It also identifies the results and learnings from these processes.

PART 7: Pilot tools developed for the project

Part seven identifies and describes five key tools necessary to transition from the LIBS pilot into the LIBS programme.

PART 8: How will we monitor?

Part eight identifies the requirements for successful monitoring of the LIBS approach.

PART 9: Where to from here?

Part nine outlines a proposed way forward into the LIBS programme, including a proposed work programme and funding model.

2   The LIBS programme and pilot project

2.1   The regulatory context: Waikato Regional Policy Statement

Under the Resource Management Act 1991 (RMA), the WRC has a role in terms of maintaining indigenous biodiversity (Section 30(1)(ga)) and the maintenance and enhancement of ecosystems in water bodies and coastal water (Section 30(1)(c)(iiia)). District Councils have a similar function to maintain indigenous biodiversity under Section 31(1)(b).

The maintenance of indigenous biodiversity and ecosystems is critical in achieving the purpose and principles of the RMA. Section 5(2)(b) refers to safeguarding the life supporting capacity of ecosystems. Biodiversity is a component of ecosystems and maintaining and enhancing it is one means of achieving the direction of Section 5(2)(b).

Biodiversity provides for elements of indigenous natural character which need to be preserved as part of Section 6(a). Section 6(c) requires the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna.

Indigenous biodiversity has important cultural values reflected in Section 7(a) by having regard to kaitiakitanga and in Section 8. Section 7(d) requires that particular regard be given to the intrinsic values of ecosystems. Maintaining and enhancing biodiversity will contribute to achieving these directions.

2.2   The challenge: Maintaining indigenous biodiversity

The RMA biodiversity function (as amended in 2003) includes an objective within the function itself. Not only do local authorities have to manage natural resources so as to avoid, remedy or mitigate adverse effects on biodiversity, they must also *maintain* biodiversity.

This is a big task for the following two reasons.

1. Maintaining biodiversity in the face of various threats will likely require more than managing the adverse effects of resource use and will require active interventions by councils, other agencies or both.

2. Whether biodiversity is maintained will depend on a range of parties and actions outside of a local authority's control (including for example, how well Department of Conservation (DOC) manages its estate and species recovery programmes).

There has also been a tendency for discussion about biodiversity to revolve around the protection of Significant Natural Areas (SNA) (as dictated by S6 RMA) rather than about how to maintain biodiversity across the landscape.

While these sites are critical dimensions in biodiversity management, ecosystems supporting biodiversity cross the *landscape* and sites seldom operate in isolation from their surrounding environment (biota moves in and out of such areas, while water, nutrients and energy flow through sites). Managing biodiversity is not simply about managing defined areas of vegetation in isolation from their surrounding context.

So to maintain biodiversity we need to **partner with others** to manage **ecological networks** at district and regional levels.
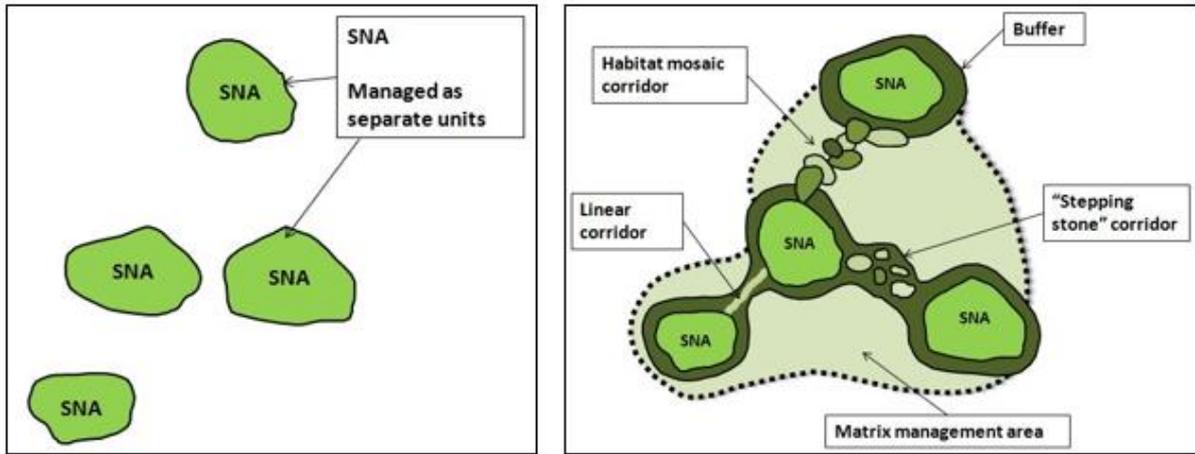
Figure 1: **Sites vs landscape**

2.3 The context: The need for change

The natural environment is fundamental to our well-being, health and economy. The natural environment provides us with a range of benefits – ES including food, water, materials, flood defences and carbon sequestration – and biodiversity underpins most, if not all, of them.

Within the Waikato region, indigenous vegetation cover has been reduced to less than a third of previous cover. Wetland habitat has been reduced to one per cent of original extent. Lowland forest and coastal forest vegetation types have been similarly depleted.

The distributional pattern of what remains is not uniform, with the majority of what remains falling in the hill country and upland areas of the region, with very little remaining in lowland areas. This pattern is strongly correlated with those parts of the region that possess attributes (e.g. climate, fertility, and landform) conducive to agriculture and human settlement. [See Figure 2]

This existing biodiversity pattern results from the current paradigm that places land use activities (such as farming or urban development) and biodiversity at odds with each other. This dictates an adversarial approach to biodiversity (and resource) management and reduces our ability to seek win-win opportunities.

The pressures on our land and water are likely to continue to increase and we need to learn how to manage these resources in ways which deliver multiple benefits. For example, achieving profitable and productive farming while also adopting practices which enhance carbon storage, improve flood water management and support wildlife.

| Indigenous Vegetation cover 1840 | Indigenous vegetation cover 2012 | 2012 cover – private land |
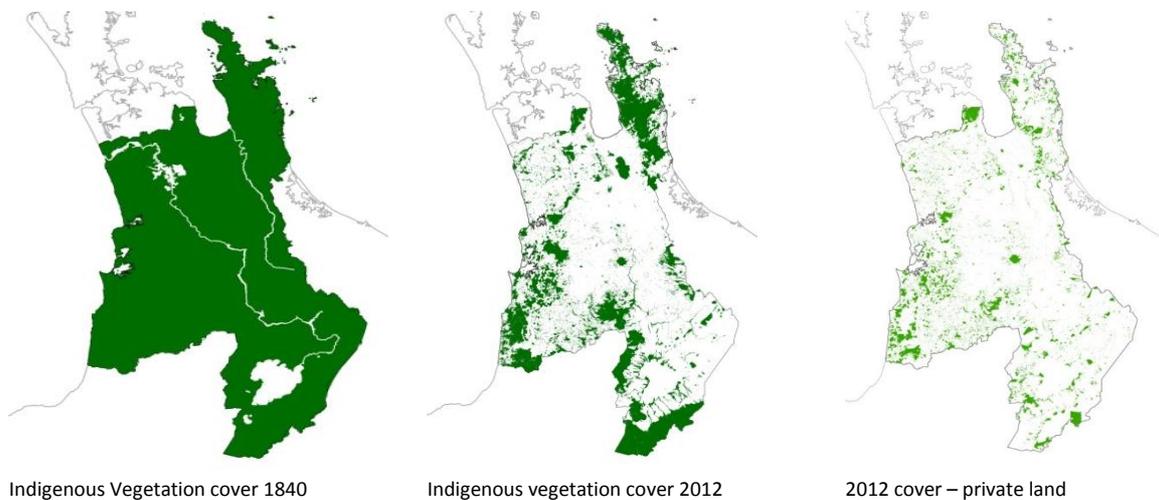
Figure 2: **Indigenous vegetation cover comparison 1840-2012 - Waikato Region**

2.4   The Response: Responding to the issue

A new paradigm of integrated land (catchment) management based on co-operation and integration (within and across organisations) is required. One that enables us to seek out win-win opportunities by collaborating with others and is underpinned by a strong values base (the four wellbeings: economic, social, cultural and environmental). The new paradigm enables a shift to discussing biodiversity <u>and</u> development rather than biodiversity <u>or</u> development, and highlight the multiple benefits that can accrue from such an approach.

This paradigm and approach underpins the biodiversity provisions of the Waikato RPS. Chapter 11 Indigenous Biodiversity anchors this new way of managing biodiversity into a statutory document. It seeks to achieve a co-operative and strategic approach to biodiversity management through:

- **Policy 11.1**, which seeks to promote positive indigenous biodiversity outcomes and sets a particular focus on:

    1. The continued functioning of ecological processes and provision of ES.

    2. The restoration and re-creation of habitats and the buffering and connection between habitats.

    3. Tangata whenua relationships with indigenous biodiversity.

    4. Working towards achieving no net loss of indigenous biodiversity at a regional scale and the consideration and application of biodiversity offsets.

- **Policy 11.3**, which sets clear direction for agencies, landowners, stakeholders and tangata whenua to work collaboratively to achieve positive biodiversity outcomes. This is in recognition of the need for an integrated approach to biodiversity management.

Local Indigenous Biodiversity Strategies (LIBS; **Method 11.1.11** of the RPS) are a tool for combining the directions of Policy 11.1 and 11.3, to provide for the interpretation and implementation of these policies at a 'local' scale [See Figure 3].
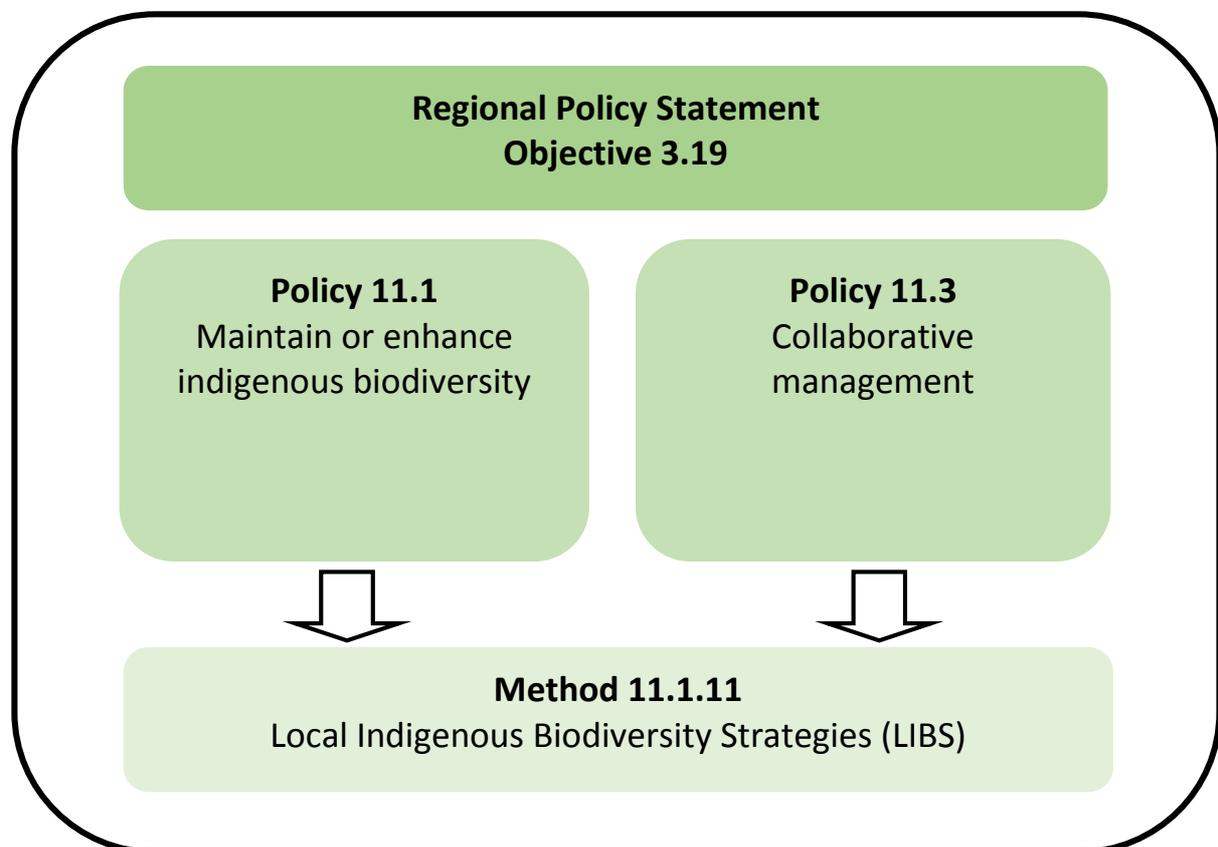
Figure 3:   **Regional Policy Statement biodiversity provisions**

2.5   The benefit: Adding value across the four wellbeings

While maintaining and enhancing biodiversity underpins LIBS, added value and opportunity is realised through broad implementation across the four wellbeings. Delivery is to be strategic and broad, fitting with WRC's strategic direction to deliver on the priority areas, and numerous RPS methods eg Maatauranga Māori, Kaitiakitanga, freshwater, soil, natural character.

The main reason for this is that to manage ecological networks requires strong ecological restoration and enhancement outcomes across the landscape. The only way to achieve such an outcome is to look at a broad range of tools that incentivise biodiversity management into existing land uses/activities.

Broad implementation across the four wellbeings also opens up a wider range of funding options and partners, rather than reliance on single (usually environmental) options.

The LIBS programme is proposed to be a community led and values-based project. The project will have a strong focus of engagement and implementation at the flax roots (hapū/marae) and grass roots (landowners/land managers) levels. The LIBS framework envisages the integration of biodiversity into both production lands (e.g. forestry, farming) and urban environments.

Weaving conservation principles into sustainable land management practices will rely on strong alignment with existing initiatives. This includes Forest Stewardship Certification, Sustainable Dairying Water Accord, local initiatives such as the Upper Waikato Sustainable Milk Project and exploration of new options including greenways[1], carbon farming, and honey production.

An identified, ecological network will also provide a coherent picture to pull together a range of existing projects (including those undertaken by WRC) and give them a clearer focus.

The LIBS programme will also encapsulate a strong Maatauranga Māori and kaitiakitanga component based on engagement with mana whenua at the marae level. Ecological protection and restoration of indigenous biodiversity as part of land development options for multiple owned Māori land can provide social, cultural, economic and environmental benefits for example through:

- contributing to marae and whanau wellbeing through sustainable ecologically based business development, including the incorporation of cultural/eco-tourism

- improving indigenous health using traditional resources (Rongoa Māori)

- education and training for Rangatahi in ecological restoration and engaging them in the land development programme.

Thus the implementation model illustrated in Figure 3 is broadened to incorporate a range of resource management and strategic directions to be achieved through the LIBS programme [See Figure 4].

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[1] The linking of ecological networks with recreation and cycle trails and other tourism opportunities.

Regional Policy Statement

| **Policy 11.1**
Maintain or enhance indigenous biodiversity | **Policy 11.3**
Collaborative management | **Other RPS Policies**
Freshwater, soils, etc | **Other RPS Policies**
Maatauranga Kaitiakitanga |

Method 11.1.11
Local Indigenous Biodiversity Strategies

Local Indigenous Biodiversity Strategy Programme

Integrated land or catchment management

WRC Strategic Direction
Working with others to build a strong economy, healthy environment and vibrant community

Figure 4: The Local Indigenous Biodiversity Programme

2.6 The project: Overview and rationale

The concept of LIBS and the co-operative approach to their development was one of the main reasons that the numerous appellants and 274 parties to the RPS Chapter 11 Biodiversity signed off on their appeals.

LIBS provides a process to partner with others to deliver a strategic and comprehensive approach to managing biodiversity in a way that:

- gives effect to the RPS
- assists territorial authorities (territorial authorities) in their role to maintain biodiversity
- recognises the need to manage sites within an ecological network
- partners with others to co-ordinate effort more effectively
- recognises the need to build capacity and capability within the community and within organisations
- opens up a broader funding base and additional funding opportunities
- supports landowners with biodiversity sites and assists them to manage those values.

A business case for the LIBS programme was developed as part of the Long Term Plan (LTP) process. WRC has approved $525,000 over three years, starting in year two of the LTP as WRC's contribution to the co-operative model.

WRC also sought support and funding from territorial authorities across the region as part of their LTP processes. South Waikato District Council (SWDC) has committed $45,000 to the LIBS programme over three years as well as dedicated staff resource.

3 The pilot project

3.1 The project

Given that the RPS biodiversity directions were signalling a shift in emphasis from previous approaches, and that some of the concepts around mapping/modelling ecological networks and how to engage effectively at the grass-roots in relation to biodiversity outcomes were relatively un-tested, the idea of a pilot project was raised.

The ability to test the LIBS model at a smaller scale, and then scale it up based on lessons learned, was considered a good investment. Learning by doing and sharing the findings with others before the larger scale roll out of the LIBS programme is a prudent approach. In this way the LIBS programme can be seen as a four year programme, with Phase 1 being the pilot project and Phase 2 being the regional roll-out.

Figure 5: **Step-wise progression from method to pilot to programme**

3.2 Background

Pre-planning for the pilot project began in October 2014 with WRC staff working through how the pilot project needed to be set up and structured and where it would be applied.

An important early decision was that the pilot would reflect a values-based approach which aligned with WRC's strategic direction and the multiple benefits or ES that can accrue from managing and enhancing biodiversity. In addition, people value biodiversity differently and being able to capture and respond to these different value sets is crucial.

3.3 Purpose

The purpose of the project is:

To test and share results of/learnings from landowner and marae-based engagement, and ecological network modelling in order to demonstrate the benefits of taking a strategic and co-operative approach to biodiversity management in a timely manner that transitions effectively into the LIBS programme.

3.4 Goal and objectives

A series of internal WRC workshops were convened to develop and define the goal for the pilot project and any related supporting objectives. It was difficult to specifically develop these goals and objectives purely for the pilot project and many are as relevant for the LIBS programme as they are for the pilot phase.

The goal of the project is:

Building on lessons learned and experience gained by tangata whenua, landowners, WRC and TA staff and others so that our collective capacity to enhance indigenous biodiversity and to restore ecosystem processes in a co-ordinated network of natural areas is improved.

There are 14 supporting objectives for the project, these are provided in [Appendix 1](#).

3.5   Project scope

The pilot project had a tightly defined timeframe (end of June 2016). This limited the scope of what could be achieved by the pilot and defined the level of community (landowner/land manager) and mana whenua (marae-based) engagement. A significant portion of the project was about disseminating and co-ordinating existing biodiversity work and looking at how this work could be better shared and co-ordinated to achieve biodiversity goals.

In scope was:

- Production of future-state ecological network map for the Waihou catchment.

- Spatial analysis of natural and social capital.

- Development of ecological targets and milestones for aquatic and terrestrial biodiversity within a multi benefit monitoring framework reflecting parallel Mātauranga Māori and citizen science components.

- Engagement with identified key pilot stakeholders (specifically identified marae cluster and engagement focus areas).

- Identification of intervention pathways (tool box including funding matrix and specific opportunities for Multi-owned Māori land) for participants to contribute to biodiversity enhancement.

- Engagement of landowners, mana whenua and other key stakeholders to assist landowner participation, undertake needs and aspirations assessments and share resources.

- Learning about existing work and providing options to assist and add value through pilot project outputs (improved co-ordination, scaling up, application of funding model etc.).

- Develop and report outputs and learnings from the pilot project with partner territorial authorities.

3.6   Location

The success of the pilot required good buy-in from territorial authorities and this was one of the factors that led to the choice of location of the pilot project. SWDC had shown initial interest in undertaking a LIBS type process for their district and this interest grew over time to include a contribution of $45,000 in their LTP for the LIBS programme.

Another important factor was the engagement at that time with the Catchment Management Officer (CMO) for the Waihou-Piako Catchment via a number of projects and processes, many of which directly related to biodiversity. This contact highlighted a number of existing programmes within this catchment that had a biodiversity focus or component such as the Willow and Poplar Removal Programme and Environmental Protection Agreement work with landowners. It also highlighted the large and sophisticated relationship network that had already been established with landowners, agencies, iwi and others.

Figure 6: Map of the pilot location – Upper Waihou catchments

Some of the existing programmes and projects include:

Catchment new works programme

- Existing and pending Environmental Programme Agreements (EPAs) with upper catchment properties, protecting and managing SNAs involving QEII, Nga Whenua Rahui (NWR), and District Councils.

Poplar and willow removal/riparian management programme

- Eco-network promotion through riparian management.
- Advocacy through working party/champions/demonstration sites.
- Task force/social enterprise opportunities.
- Links to education projects.

Biodiversity on scheme land project

- Opportunities for WRC to prioritise our biodiversity enhancement on scheme land in the context of LIBS.

Co-management approach

- Focussed engagement/collaboration with iwi, hapu and marae, NWR and relevant research agencies.

Strategic partnerships

- Focus and support to Kaimai Catchment Forum and community groups.
- Alignment of other key stakeholders to support landowners.

Waikato prioritisation project

- Initial evaluations that prioritized biodiversity in the upper Waihou will be further refined.

The pilot location also provided the following advantages.

1. A good mix of developed and under-developed lands with a cross section of land types, including production forestry, sheep and beef, dairy run-off, dairy, multi-owned Māori land, Public Conservation Land, and WRC-managed scheme lands.

2. Pristine water quality in the headwaters – with measurable deterioration across the sub-catchment moving towards to sea.

3. Some representative sampling/monitoring of aquatic health within the sub-catchment.

4. Potential for eco and cultural tourism opportunities linked to ecological restoration.

3.7 Project work breakdown structure

The following work breakdown structure identifies the five key packages of work that combine to form the pilot project outputs as well as the required project management.
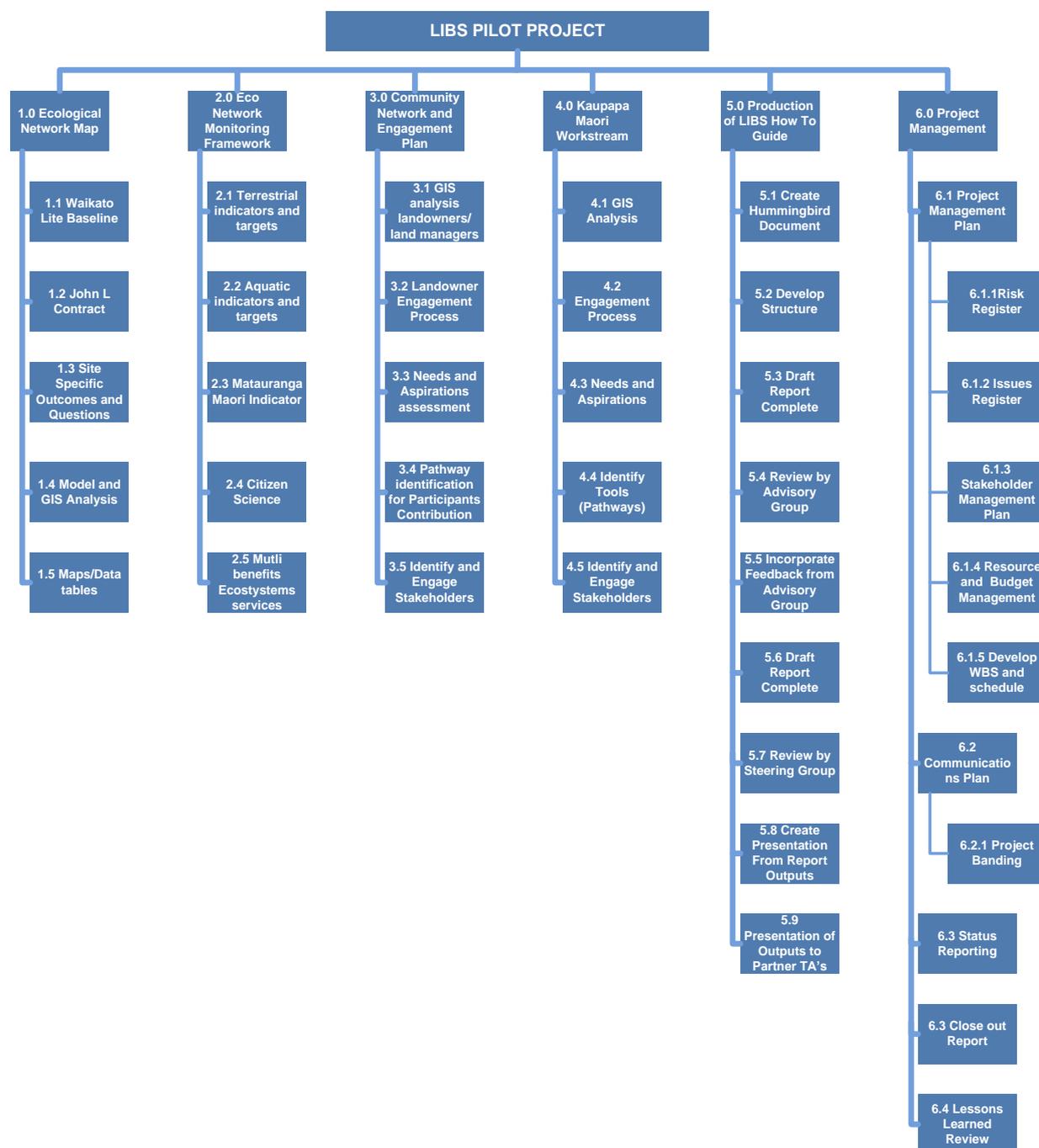
Figure 7: **Work breakdown structure**

The detail around the work breakdown structure for the project was refined throughout the project planning phase. The project consists of two technical workstreams and two social (or engagement) workstreams, with another workstream around pulling all learnings into a final report and other related outputs (for example, the "LIBS How to Guide"). These workstreams are described in the following sections of the report:

- Workstream 1 – the ecological network modelling is dealt with in Part 7 of the report.
- Workstream 2 – the monitoring framework is covered in Part 8 of the report.
- Workstream 3, community engagement
- Workstream 4, marae-based engagement are covered in Part 6.

3.8   The project Tohu

It was important for the project that the tohu (symbol/logo) resonated with the marae and hapū associated with the Waihou River as well as the general community.
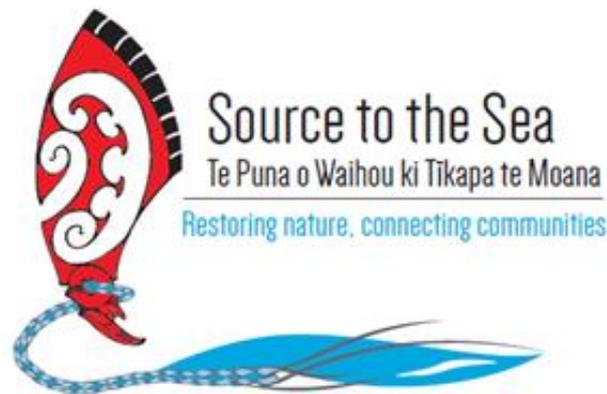
Figure 8:   Project tohu or logo

The tohu is based on a traditional kohua (bailer). Typically kohua are used by the young to remove water from the waka to ensure it remains afloat. The Waka is built to carry all to a common destination.

In the context of this project, the kohua symbolises the need to enhance our well-being by keeping our biodiversity afloat and to sustain it into the future. We all have a role in doing this as kaitiaki (guardians) but especially our rangatahi, our young people as the future generation.

The top row of block figures represents all the marae and hapū associated with the Waihou River. The large central figure represents the Tainui waka. The iwi associated with the wider catchment are represented within that figure, including Raukawa, Hinerangi, Haua and Hauraki. The small figure represents the beginning and growth of our kaupapa (Source to sea). The bottom figure represents our tupuna Raukawa. The whole figure also represents a sail that is awaiting energy to gain momentum.

The kohua was attached to the balers hand by a woven flax rope, the project's tohu represents this rope as made up of four strands, representing the four key values that underpin the project – social (connecting local communities), cultural (supporting kaitiakitanga), economic (supporting local economies) and environmental (restoring natural environments). The rope is strong and the baler secure if all four strands are in place. When one or more strands is not in place the hold on the baler is weaker, and the risk that the waka will fill with water and sink is greater. The flax rope frays and morphs into the blue block of colour representing both the puna (spring) and the river (Waihou).

This taonga (treasure) was developed by Ora Kihi. The involvement of Dave Thompson and the marae had a significant spin-off benefit in the form of the concept design of the project logo or tohu. Project branding was an issue that was proving elusive and the work that Dave and his son-in-law Ora Kihi were able to provide gave a significant boost to the project. This taonga was gifted to the project.

The project branding was a key part of the project and was strongly linked to the Kaupapa Māori workstream of the pilot [see section 7.6 Marare-based Engagement]. The branding features heavily in both the website http://www.waikatoregion.govt.nz/Environment/Natural-resources/Biodiversity/Source-to-Sea--Te-Puna-o-Waihou-ki-Tkapa-te-Moana-/ and brochure development.

4   Project governance

4.1   Project structure diagram

From March 2015, a draft project management plan was developed linking into the WRC Project Management Framework. A project outline document had already been developed [DOC#3204950].
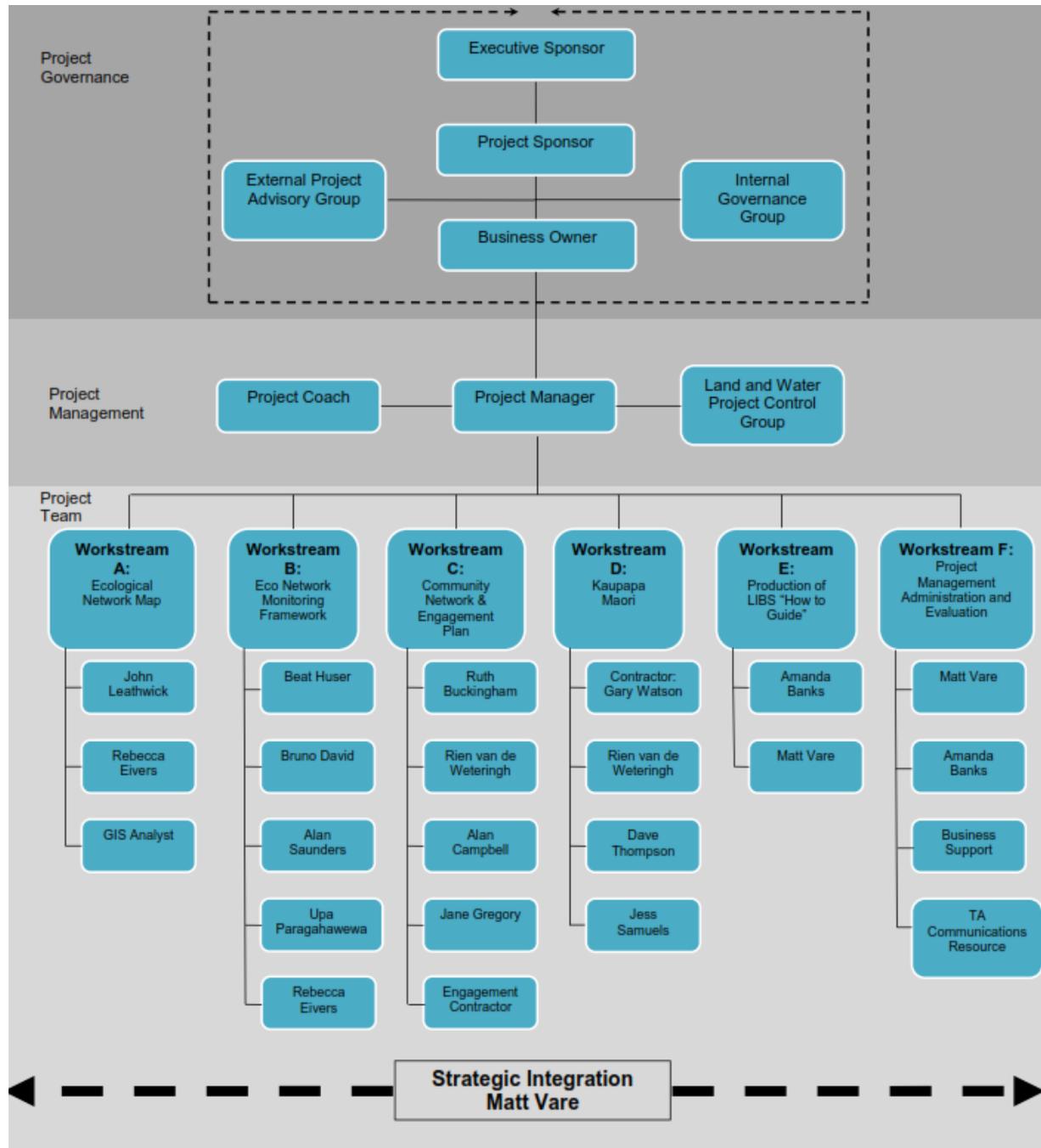
Figure 9:   **Project Structure**

Momentum on developing the project plan increased under the direction of project coach Sharon Rayner. Project planning was detailed and formalised up to September 2015, with the Planning Stage Date Review (DOC#3571191) signed off by the Project Sponsor on 4 October 2015.

4.2   The external advisory group

To avoid sector capture it was proposed that an external advisory group be identified and convened to develop and test the LIBS pilot project. The make-up of this group reflected a <u>values-based approach</u> (economic, social, cultural, environment) that aligned well with WRC's strategic direction.

It was proposed that the External Advisory Group (Advisory Group) be made up of experts in their field who become external champions for the project with strong links to their extensive networks.

The key role of the advisory group was to provide governance to the project through experience, ideas, and connections, largely through regular advisory group meetings. Due to the strong alignment to values, it was expected that advisory group time/costs could be largely absorbed as part of their existing work programmes.

The following people were identified (and all subsequently confirmed) to be on the Advisory Group:

Table 1:   External Advisory Group

Value	Who	Organisation/network
Environment	Prof Bruce Clarkson	University Of Waikato – Dean, Faculty of Science and Engineering. Head of Environmental Research Institute. Interim Director NZ Biological Heritage National Science Challenge.
Cultural	Chris Koroheke	AgResearch – Portfolio Leader – Māori Agribusiness
Social	Dell Hood	Waikato DHB – Population Health. Medical Officer of Health. Member of Waikato Conservation Board.
Economic	Don Scarlet	Mighty River Power – Key Relationships Manager. Trustee of Waikato Catchment Ecological Enhancement Trust. Director Hamilton and Waikato Tourism.

There was significant buy-in and commitment from the Advisory Group throughout the project, despite the members being extremely busy people. One of the reasons for this was their alignment with the underlying philosophy of what LIBS was trying to achieve. The project evaluation phase[2] identified that it was the way the project was constructed – enabling each person to attach to the value that resonated most with them – that was largely behind this support.

The unique approach of integrating across the four wellbeings, respecting members as experts within their particular value set, and allowing a forum for debate and testing of ideas from different perspectives, provided an enjoyable and challenging environment from which to operate and steer the project forward. It was seen as a refreshing, innovative method which has the potential to make transformational change. Additionally, the values-based approach was seen as a useful way to have discussions with a range of stakeholders whom have been 'outside of scope' of traditional approaches to biodiversity restoration.

The Advisory Group met for the first time on 23 January 2015 and set an initial monthly meeting schedule to kick-start the project. Agendas were set and sent out prior to each meeting, accompanied with relevant reports or information. Minutes/notes were collated from each meeting and follow up actions recorded and presented at following meetings. In all there were 11 meetings held, with the monthly cycle extended to six weekly as the project progressed.

All meetings were held at Waikato University in the Dean's Suite – Biological Sciences, over the period 11-2pm which worked best for the group and all were catered (working lunch). This was the only project cost from holding the Advisory Group meetings.

The initial meeting focussed on understanding the people on the group, why they were interested in being part of the Advisory Group and what success of the project would look like to them (Whakawhanaungatanga). This highlighted the passion that everyone had for the project and set the tone for subsequent meetings.

Identifying success across the different value sets was illuminating as it highlighted the breadth of outcome from a holistic ecological restoration approach.

For Dell (social value) it was about:

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[2] Project evaluation questions and reporting undertaken by Amanda Banks – see doc#3566100

"Showing increased wellbeing, a more positive spirit, improved quality of life, increased employment opportunities, and reduced health costs. There was a strong component of youth involvement and development and links to schools/kura."

For Chris (cultural value) it was about:

"…physical evidence of improvement to the Wairua, education, korero linking old and young people, career pathways available to lure mokopuna back to the marae."

For Don (economic value) it was about:

"…the ecological networks being defined, embraced and owned by the community, natural areas being protected and managed through a variety of mechanisms, of local governance and ownership of the project, of resources being delivered and targeted, and delivery of an environmental enhancement service linked to kaitiakitanga."

For Bruce (environmental value) it was about:

"…community capacity-building to restore biodiversity, community agreement around natural capital (NC), understanding of the current state of biodiversity – decline factors are understood, knowing what to do to reverse those factors/causes, making a difference will be long term, and how to find the money and resources to fix it."

The second Advisory Group meeting highlighted the merits of a user-friendly project description which could form part of the project communication plan. The advisory provided significant input into this:

Local Indigenous Biodiversity Strategies (or LIBS for short), is a project that seeks to make a transformational shift in how we view and manage indigenous biodiversity. LIBS will provide a regional-scale ecological restoration framework that connects up the numerous ecological projects that are already going on and stitch them all together.

The process for developing LIBS is as important as its implementation. It will focus on grass roots involvement, empowerment and ongoing delivery, including building community capacity at the marae level. Engagement at this level will seek to find out about the needs and aspirations of land owners and mana whenua and how this aligns with requirements to provide for healthy biodiversity across the landscape.

It is hoped that these discussions will highlight a variety of opportunities available to enhance biodiversity and provide for economic, social and cultural development, as well as providing a range of enduring solutions to achieve this. LIBS is as much about increasing wellbeing, employment and education opportunities, reducing health costs, and providing for kaitiakitanga, as it is about enhancing biodiversity.

Landowners and mana whenua will be supported by involving a range of stakeholders in the process and the development of a broad-scale funding model. This will assist with building knowledge and skills, enabling ongoing community involvement, delivery of on-ground ecological enhancement, monitoring of progress, and the effective co-ordination of the ecological restoration network over time.

A range of other key topics were highlighted and discussed by the Advisory Group which were invaluable as part of project planning including:

- stakeholder mapping and evaluation
- pilot project branding
- funding model approach.

4.3   Internal Governance Group

This group was formed as part of finalising the project management plan and met for the first time on 27 October 2015. The LIBS pilot project is about testing a different way of undertaking biodiversity management and learning from those lessons moving into the LIBS programme. Taken as a whole, the LIBS programme is about bridging the gap from policy (RPS) to implementation. It is therefore crucial

that the internal governance of the project linked effectively across WRC into the delivery parts of the organisation. This group was made up of:

- Melissa King-Howell – Pou Tuhono, Tai Ranga Whenua (Community and Services Directorate)

- Patrick Whaley – Integrated Catchment Services Manager (ICM Directorate)

- Graeme Osborne – Manager Hauraki/Coromandel Catchment (ICM Directorate)

- Annika Lane (as Business Owner) – Manager, Integration (Science and Strategy Directorate)

- Tracey May (as Project Sponsor) – Director, Science and Strategy

Reporting to this group was via project status report template [DOC#3594195 and 3594026].

5 Communications plan and stakeholder register

5.1 Communications plan

A bespoke communication plan [DOC#3503482] was developed for the project in conjunction with WRC communications team. The following key objectives were developed:

Internal

- Educate relevant WRC staff on the project – what it is, how it will affect work already being done in each directorate and the key directorate contacts across the organisation.

- Identify the links between WRC's Strategic Direction, RPS, LIBS programme and the pilot project to provide a clear line of sight from issue to policy to delivery.

- Effective sharing of pilot learnings across the organisation to assist effectiveness, align policy and delivery functions and highlight options for working with others.

External

- Educate pilot project stakeholders and the local community on the environmental and economic benefits of protecting and re-establishing indigenous biodiversity in the catchment.

- Engage partner landowners in the catchment and Hinerangi Tawhaki Marae, and territorial authorities (SWDC, MPDC) in the project to test and learn from the co-operative approach to managing biodiversity.

- The new co-operative model tested through the pilot becomes 'business as usual' as part of the LIBS programme rollout with territorial authorities.

In addition there were several key outputs from the communications plan – these are identified in the tactical plan (see below).

Table 2:   Communications Tactical Plan

Tactical plan: Internal audiences

What is to be done	Why	Who	When	Comments	Complete
Establish page on OurPlace	To provide staff with general information about the project, contacts in each directorate and FAQs, as well as a link to the external webpage	Communications (in liaison with Matt Vare)	Mid November 2015	To be updated as required	
Bulletin stories	To provide staff with specific stories on aspects of the pilot project to demonstrate what LIBS is about.	Communications (in liaison with Matt Vare)	From late November 2015	Stories to be produced in line with developments in the project	

Tactical plan: External audiences

What is to be done	Why	Who	When	Comments	Complete
Establish brand	To provide a recognisable and empowering brand for the project which resonates with people	Communications Project lead	November 2015	Draft to be developed by communications by 16 October for feedback from iwi partners.	✓
Establish page/s on WRC website	To provide members of the public, stakeholders etc with up-to-date and more detailed information on the project. Printed collateral will be available as PDFs on this page	Communications Project lead	November 2015	Draft text to be completed by 16 October for feedback from project lead and project sponsor	✓
Printed collateral (e.g. brochures)	Produce collateral in English and Māori to show the project's aims and benefits. Share 'hero' stories as examples of what some landowners are doing to achieve biodiversity gains.	Communications (with project lead and marae engagement lead)		Possible images to be sourced by Rien Draft text to be completed by end October for feedback from project lead Content to be finalised in early December and printed collateral available for 12 December hui	✓
Videos of "eco-champions"	To feature interviews with landowners and iwi involved in the project, as well as other	Videos being produced as part of contract with Groundworks Ltd, who are doing the	First video to be completed in December 2015	Filming and editing of the first video to be completed in December 2015 WRC's image release agreement provided for signing by all those interviewed enabling	✓ (captured as part of landowner engagement

	stakeholders to promote the project and its aims Videos to be used in workshops, presentations, on social, and as part of the 'how to' package to information territorial authorities and other stakeholders	landowner interviews for the project	videos and raw footage to be used into the future	by Groundwork Associates)
Social media	Photos showing us meeting with iwi and landowners about the pilot project as a way to "socialise" the issue of biodiversity loss and the work being undertaken to restore it	Project team to supply Communications with images (in a timely way)	Ongoing	First meeting with iwi in November the weekend following the marae's 100 year celebration Approval to be obtained for the use of photos by WRC
Your Waikato	Produce story for the June (or Sept) 2016 issue of the council newspaper to socialise the project with the general public, building on information in the 2015-25 LTP	Communications (with project lead)	June or September 2016	

5.2 Stakeholder register

Stakeholder mapping was a key focus of the External Advisory Group who requested early on that we undertake a stakeholder analysis, identifying different stakeholders, and their potential level of involvement or interest in the project. This work subsequently developed into the stakeholder register [#3929116] that sits with the project management plan.

Identifying, organising and co-ordinating the multiple players involved in biodiversity management is integral to the pilot project goal to enhance our collective capacity to achieve biodiversity outcomes. Grass-roots (landowner and mana whenua) engagement is a key part of this. The table below summarises stakeholders and project interest for the pilot project.

Table 3: **Stakeholder Summary**

Partner/Stakeholder:	Project Interest:
Hinerangi Tawhaki Marae **Ngati Hinerangi**	Support for site-based eco restoration. Delivery of Co-Management at place aligned to Treaty Settlement timeframe.
Raukawa Charitable Trust	Iwi environmental management plan shared outcomes. Delivery with marae partnerships.
WRC constituent Councilors	Location of pilot and community engagement.
Matamata Piako District Council (MPDC) and SWDC Councilors and staff	Territorial authorities are key to successful delivery of the LIBS programme. Engagement through the pilot will include key messaging around partnering for the LIBS programme.
DOC	Pilot provides opportunity to more effectively engage Kaimai Forum and test the partnership model that DOC is trying to operate.
Heritage New Zealand	There is high potential for overlap between cultural sites and biodiversity sites.
Target landowners/farmers in Pilot location	Landowners/land managers who are already undertaking biodiversity enhancements and environmental improvements as part of their business. They represent the positive agents of change who can influence their peers and provide guidance as to how other key stakeholders can assist further ecological enhancement.
Hancock Forest Management **Fonterra** **DairyNZ** **Federated Farmers**	Key industry stakeholders that can assist landowners and land managers in improving biodiversity outcomes. Opportunities for improved co-ordination and resource sharing.
EDS **QEII** **NWR** **Forest and Bird**	NGOs with specific interest in biodiversity and agencies with ability to assist landowners with funding/support for improved management.
RPS biodiversity chapter appeal parties	The LIBS method was key in getting sign-off from parties. Parties may be interested in the pilot project and its outcomes.
Waikato River Trails Trust	Strong overlap between recreation and tourism goals of the Trust and ecological restoration and enhancement via networks. Opportunities to link biodiversity enhancement with economic development outcomes and scale up existing ventures.
Kaimai Forum	The Kaimai Forum has relatively broad reach and biodiversity has been identified as one of their key targets. LIBS pilot can assist to deliver more strategic approach.

Partner/Stakeholder:	Project Interest:
Enviro Schools + Toimata Foundation	Existing links with enviro schools in the pilot area are in place and further opportunities can be highlighted, for example through the Trees for Survival Programme and culturally appropriate biodiversity programmes based on Māori world view.
Work and Income New Zealand (WINZ) Wintec	Interest in linking social enterprise and workforce/training components of ecological restoration.

6   Engagement

Workstreams 3 – *Network and Engagement Plan* and 4 – *Kaupapa Māori* both focussed on engaging with landowners, land managers and mana whenua as key stakeholders. This section of the report looks at the groups that were involved, the engagement methods used, and the outcomes of the engagement.

6.1   Who did we engage with?

Landowner engagement and marae-based engagement are two key cornerstones of the pilot project approach. Testing and understanding flax roots (hapu/marae) and grass roots (landowners/land managers) processes and approaches is key to supporting a framework that integrates biodiversity restoration into both production lands (such as forestry, farming) and urban environments.

6.1.1   Landowners

Effective landowner engagement was identified early on by the External Advisory Group as a critical component of the pilot project. Advice received suggested that identifying supportive landowners who were already undertaking environmental and ecological improvements on their land and using these "champions" to form the basis of a coalition of the willing, was the best method of gaining momentum.

The pilot project's tightly defined timeframe of end June 2016 limited the scope of what could be achieved and helped to define the level of community (landowner/land manager) engagement.

6.1.2   Internal resources

At the same time support for this part of the process, especially around engaging and facilitating input from the community, was initially sought through the social science resource within Science and Strategy Directorate of WRC. It quickly became apparent that the level of support necessary within the timeframe of the pilot project could not be provided, largely through significant commitments to other large internal WRC projects. The decision to seek external consultants was agreed and Groundwork Associates were engaged to undertake the landowner facilitation and engagement process.

6.1.3   Marae-based engagement

Effective and appropriate engagement with mana whenua was identified early on by the External Advisory Group as a critical component of the pilot project. In addition, the need to build capacity at the marae-level was identified as a critical gap to be filled if mana whenua were to be successfully engaged in supporting (and driving) biodiversity protection and physical restoration work.

Nga Uri o te Ngahere Trust was engaged to support the pilot project and lead the Kaupapa Māori workstream, based on their work on ecological restoration linked to improving social, economic, cultural and environmental capital of shareholders of Multiple-Owned Māori land.

6.2 How did we engage with them?

6.2.1 Community network mapping

The Catchment Management Officer for the Waihou-Piako Zone, Rien van de Weteringh, had built up a large and sophisticated relationship network as part of his role in that location, including landowners and land managers. This information became the building blocks for developing community network maps – essentially hot spots of environmental activity within the zone.

Figure 10: Example of community network mapping, including marae cluster along Douglas Road.

Further analysis including data from SWDC on landowners who had sought funding from their Environmental Initiatives Fund (EIF) was undertaken to add clarity.

6.2.2 EIF funding to support mana whenua capacity building

A successful bid to WRC's Environmental Initiatives Fund in August 2015 was a key step in starting to build marae-based engagement capacity. It enabled Kaumatua Dave Thompson[3] to provide the groundwork and utilise his whakapapa networks to set up the marae-based conversations. This was essential in getting this aspect of the pilot project off the ground. It not only set up the ability to link into marae-based conversations about biodiversity but it also enabled an interface between staff and mana whenua (Hinerangi Tawhaki).

A process to engage Māori on their terms and within an appropriate framework significantly increases the likelihood of ongoing commitment to the biodiversity restoration kaupapa.

In addition, the tightly defined timeframe for the pilot limited scope of what could be achieved and helped to define mana whenua engagement. Mana whenua engagement was focussed at a specific marae-cluster centred on Hinerangi Tawhaki Marae [see figure 10]. Engagement processes, learnings and tool development will be shared with other marae as part of the LIBS programme (not the pilot).

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[3] Mr Thompson was born and raised at Hinerangi Tawhaki and his family hold mana whenua within the rohe and he has extensive network across whanau who whakapapa to Hinerangi Tawhaki and to Ngati Hinerangi.

6.2.3 Community engagement scoping paper

A community engagement scoping paper was also prepared at this time (Wendy Boyce Consulting – see DOC #3467492) to enable project governance to have the information they needed to provide direction on scope and scale of engagement against timelines and budget. The main tasks included the following.

- A stock-take of existing activities to identify engagement implications, including, Marae engagement, technical and spatial information needs, existing biodiversity activities and stakeholders.

- An assessment of whether the project is at an appropriate stage to engage, including objectives, systems, timeline, budget, gaps and next steps.

The scoping paper concluded that there were multiple scales of possible engagement with internal and external stakeholders to the project, as well as a number of potential roles WRC and others could take in these initiatives.

Given that the pilot timeline had a relatively short window for engagement opportunity, taking into account seasonal cycles and the need for any engagement to report back to participants prior to reporting to the sponsoring organisations, it would be valuable to clarify scope and priorities with internal stakeholders prior to proceeding to engage externally.

6.2.4 Marae visit

Based on the work outlined in 6.2.2, we initiated the Kaupapa Māori workstream, which was launched at Hinerangi Tawhaki Marae in November 2015 by invitation of the marae trustees. The project team presented on the LIBS programme and the pilot project. It should be noted that at this point in time Ngati Hinerangi were involved in their Waitangi Claims Settlement process which involved hui on a monthly and sometimes fortnightly basis. The evening presentation on LIBS followed an all-day hui pertaining to the Treaty of Waitangi agreement in principle (AIP) process.

6.2.5 Needs and aspirations assessment

A needs and aspirations assessment based on an interview questionnaire presented at the Marae Hui [DOC#3619149] was undertaken. The questions were distributed by handout and by email. Twelve survey forms were returned completed.

The draft results from the engagement process highlight the following:

- Mahinga kai is a key focus for any ecological restoration
- Recognition of the need to improve water quality, partly linked to siltation/sedimentation from the nearby quarry operation
- Desire for an ecological restoration strategy strongly linked to waterways
- Assess opportunities to dovetail into integrated catchment planning undertaken by WRC
- Consider options and opportunities for pest control
- Look at the multi-benefits from a restoration strategy such as on-the-job training
- Build capacity around monitoring and link Mātauranga to western science
- Develop a local nursery or scale-up existing options
- Consideration of education opportunities at all levels from kura to university

The engagement process also highlighted the following:

- There were important gaps in in the survey responses, particularly youth (under 35 years), Kaumatua and Kuia

- There was feedback that the scope of the interview questions were too broad and that it needed to be re-focussed

- Not enough discussion has been undertaken to ensure that the interview questionnaire reflected a "Hinerangi" focus, it was too generic and that the capacity within Ngati Hinerangi had not been effectively tapped into (e.g. using the existing communications expertise and reach)

- That an additional on-line survey be developed by WRC in conjunction with Ngati Hinerangi (including their communications resources) to overcome the aforementioned deficiencies.

6.2.6   Landowner engagement tasks

A key part of the process outlined in the engagement scoping paper (6.2.3) included finding out about the needs and aspirations of landowners who are involved in on-farm restoration activity.

The key tasks were identified (based on the previous scoping paper and directions from project governance):

1. Individual interviews with landowners and land managers to collate success stories, share information and identify opportunities to enhance biodiversity outcomes (needs and aspirations).

2. Workshops (X3) with partner Councils to provide update on landowner engagement and to build awareness and understanding of this part of the project.

3. Convene and facilitate a multi-stakeholder workshop to consider results of engagement and input into a matrix of tools.

4. Report on key informant interviews and write up lessons learned and toolbox of initiatives for incorporation into final LIBS report.

6.2.7   Landowner "Eco-Champion" interviews

Landowners to interview were chosen based on the local knowledge of the CMO, and included those who had done significant biodiversity enhancement work on their property. Eleven landowners from seven farms (all except one within the pilot catchment area) were interviewed.

The interviews were semi-structured. They were designed to draw out any factors that had helped or hindered the landowners in their biodiversity work, and to also empower the landowners to expand on anything that was relevant to the unique context they were working in on their property. Interviews were conducted between December 2015 and February 2016.

6.2.8   Data analysis

The "eco-champions" interview data was compiled to create a matrix of tools [link from DOC#6546586] that the landowners identified as factors that supported biodiversity enhancement work on private land. The structure of the matrix was informed by the themes that emerged in the interviews.

Interview run sheets were created based on audio recordings of the interviews. Significant themes that emerged across the interviews were identified, and each theme was assigned a unique keyword. Each interview run sheet was then analysed for mention of these themes and coded with the relevant keywords.

Once the interview run sheets were coded with the relevant keywords, it allowed the analyst to compare responses from different landowners on the same topic. The themes were then broken down into specific tools that agencies could use to influence biodiversity work on private land. The tools matrix records each comment from the landowners that was relevant to that tool, and

it identifies positives and negatives of each tool, and synergies or conflicts between tools. The draft matrix was presented at the stakeholder workshop and wider stakeholder comments and suggestions were added to the landowner perspectives.

6.2.9   Council workshops

Three council workshops were then facilitated by Groundwork Associates. Both councillors and staff members were present at all three workshops.

The two district council workshops were intended to introduce the LIBS project to the two partner district councils (SWDC, MPDC), to present the draft results of the landowner interviews, and to further engage their support as partners in the project.

The WRC workshop was intended to update WRC councillors on this aspect of the LIBS pilot project, and to present the draft results of the landowner interviews, focusing on those results which were most relevant to the WRC.

6.2.10 Multi-stakeholder workshop – overview

A workshop was conducted at the Don Rowlands Centre at Lake Karapiro on 26 April 2016. A range of stakeholders were invited by WRC and district council partners based on their prior contribution, or potential future contribution, to the enhancement of indigenous biodiversity in the pilot area (upper Waihou-Piako catchment).

The objectives of the workshop were to:

- hear the support on offer from regional and district partners
- receive the most up-to-date information about biodiversity in the catchment
- use maps to show existing on-the-ground initiatives to protect or enhance biodiversity
- hear and discuss community engagement results to date
- discuss local priorities and initiatives
- identify and align sources of support to ensure effective results on the ground
- share the process of marae-based engagement and findings from that initial engagement

The draft results from the community and marae-based engagement were presented at the workshop and feedback was collected through small group discussions on each category of tools.

Some other important benefits resulted from the workshop, where key stakeholders with similar or aligned aspirations, for example Wintec and Ngati Haua Mahi Trust, connected with the results of the marae-based engagement. Wintec are keen to support a relationship with WRC (and LIBS partners) around their three kete vision of Education, Employment and Enterprise to scientific projects, including ecological restoration and the strong emphasis on relationships with whanau and marae. The Ngati Haua Mahi Trust's (Ngati Haua, MPDC and the Anglican Church) mahi is to provide sustainable training and employment opportunities for marae and the community linked to enriching the wellbeing of the environment. The established environmental unit and plant nursery undertake ecological restoration initiatives within their rohe (which overlaps with the LIBS pilot area). These relationships can be nurtured and opportunities further assessed moving forward into the LIBS programme.

6.3   Engagement outputs

6.3.1   Tools matrix

The major output of the community engagement was to generate a matrix of tools that enhance or protect biodiversity on private land. This matrix is intended to be a living document for further distribution and feedback from landowners, mana whenua and stakeholders during the roll-out

of the LIBS programme. It has been provided as a Google docs file in order to allow anyone with the link to comment, and to facilitate online editing by multiple collaborators.

6.4   Lessons learned

Engagement and collaboration were at the centre of the pilot project, and will continue to be central to the LIBS programme. The amount of information gathered during the pilot will be valuable to consider during the LIBS roll-out.

Lessons learned regarding how to encourage biodiversity restoration and enhancement on private land:

- regional coordination/networking to reduce compliance costs on landowners
- "grassroots" support and local ownership of biodiversity initiatives is the best way (community doesn't value it if council just does it, need to put resources along with willing participants)
- meet landowners on their land, improved relationship management
- facilitate improved agency coordination:
  1. workshop to find out who's doing what
  2. workshop to identify how to integrate what we're doing
- set up and implement a system of biodiversity offsetting/credits or payments for ES to recognise the public value being generated by the landowner's private investments into biodiversity
- undertake farm planning in a way that integrates biodiversity with water, soil and farm profitability and uses land management units rather than land use capability
- use data from multiple farm plans to inform catchment level planning and inform Integrated Catchment Plans.

Lessons learned from the marae workshop:

- The engagement of the kaupapa Māori contractor and marae-co-ordinator also helped to build the awareness and capacity within the project team, so that a strong cultural focus began to emerge.
- Some deficiencies in the engagement process and design were highlighted and these were acted on by WRC staff and Ngati Hinerangi.
- It is important to extend consultation to include Kaumatua,Kuia and Rangatahi.
- There is a desire to formalise the commitment of marae within Ngati Hinerangi to the LIBS programme post the pilot phase. This needs to be carefully considered alongside the commitment of Ngati Hinerangi during finalising their Treaty Settlement processes.
- There is potential for WRC to consider the application of other existing marae-based environmental programmes to assist implementation of the LIBS approach. One such option is the Parekore programme, now a nationwide marae-based waste reduction project.

Other key areas of learning:

Many rural landowners and farmers in the pilot area have invested significant amounts of their own money and time on biodiversity protection and enhancement. Acknowledging and celebrating this voluntary private investment in the public good that many landowners are choosing to make is critical to encouraging this practice and continuing to build relationships in the community. Ongoing maintenance of plantings and protected areas require huge long term time investments by the landowner, and are critical to maintaining biodiversity assets. Councils and other stakeholders have the opportunity to celebrate the voluntary work of landowners and

coordinate effectively with other agencies to help make this voluntary investment as successful as possible.

Time efficiency and practicality of biodiversity initiatives is critical to farmers. Agencies can help by ensuring that getting through any "red tape" required to initiate and execute biodiversity restoration is as simple and quick a process as possible. Ideal rules are those that achieve the desired ecological outcome with as few negative impacts on the farming system as possible.

The farm planning process, if done well, has the ability to achieve multiple objectives, both for the farm business and the environment, and to remove some of the red tape for landowners wanting to make a positive change in land use. Agencies can help by supporting landowners to feel ownership of their farm plans, and to allow room for creative solutions in farm plans, since every farm operates in a unique environmental context. For farmers with little money to invest in biodiversity, the most practical method of subsidising their investment may be to leverage economic benefits alongside environmental gains by, for example, fencing according to land management units rather than ring fencing biodiversity areas.

One-to-one site-specific advice from knowledgeable people is extremely helpful to the landowner implementing biodiversity initiatives on the ground. The most valuable experts are those who can provide support overcoming farming challenges to get ecological success on the ground, and who also have knowledge about funding opportunities and the regulatory and legal process. A lot of the issues that arise with restoration work are site-specific, so face-to-face on-farm interaction is critical. Established farmers who have done a similar project on their land in the past are the most trusted source of advice.

Agencies can help by ensuring that their field staff, including consent officers, prioritise building a relationship of trust with landowners, and are trained to consider multiple environmental objectives (i.e. not just water quality in isolation) in their decisions and advice. It is also important to ensure consistency of advice provided by different council staff members. If there is scientific disagreement on the best ecological method to achieve an outcome - for instance on how to control weeds prior to planting riparian areas - then several options could be put before the landowner rather than one method being mandated.

7 Pilot tools developed for the programme

7.1 Overview

The LIBS framework outlined in the RPS, although delivering on ecological outcomes (RPS Objective 3.19 [see Appendix 3]), always envisaged a broad implementation (RPS Objectives 3.8 and 3.9 [see Appendix 3]) and alignment with WRC Strategic Direction priorities. To manage ecological networks requires strong ecological restoration and enhancement outcomes across the landscape. The only way to achieve such an outcome is to look at a broad range of tools that incentivise conservation management into existing land uses/activities.

LIBS method 11.1.1 notes the most appropriate mix of methods for each district (regulatory and non-regulatory) will be identified. A key theme of the LIBS approach is to highlight opportunities for improved co-ordination and integration of existing activities within a strategic framework and to add value to these activities (projects) rather than duplicating them.

The LIBS Pilot Project has been about learning and enabling year one of the LIBS programme to be effective in its use of resources. Year one of the programme is about further developing an effective framework to enable more effective and co-ordinated biodiversity implementation going forward.

The pilot has identified a range of existing and potential tools [see Appendix 4] and identified and initiated some key relationships to enable these tools to be effectively delivered in future. These relationships will need to be further refined through year one of the programme in order to develop a draft implementation plan. Such a plan can assist stakeholders to determine the

level of investment required to achieve their biodiversity outcomes, to identify where they need to be working (to avoid unnecessary duplication) and also identify opportunities to work with others if appropriate (to add value and share resources).

This section provides an overview of the key tools for consideration in the development of an implementation plan. The tools, their value to the programme, the organisation and to the work of others, and a suggested pathway forward into the programme on how to apply them or if further development and refinement is required, are included in this section.

7.2 Tool 1 – ecological network modelling and map

The pilot project established proof-of-concept for modelling and mapping a future-state ecological network of the pilot area. It maps a prioritised ecological network based on habitat representation and connectivity. Building on a separate but related project, "Waikato Regional Prioritisation" used the spatial conservation planning programme "Zonation", which determined the priority of remaining natural areas for non-regulatory conservation management. As zonation has also been used by DOC to nationally prioritise ecosystem management on public conservation land, a holistic and complementary approach to ecosystem management and protection will be able to be developed within the region.

The potential to build on this static data approach through the LIBS pilot project was recognised to enable modelling of future focussed ecological networks under a range of different scenarios. For example, where can we re-create habitat types that are under-represented or below key ecological thresholds? Where can we add ecological connections or buffers to increase the size of core areas and reduce edge effects? Where can we provide riparian habitat to improve aquatic biodiversity (and water quality)? Where are the locations on land that we manage where we can demonstrate biodiversity restoration approaches and share this knowledge with others?

7.2.1 Modelling an ecological network

The spatial representation of local (district/catchment/regional) ecological networks is a key component of LIBS. It can provide the strategic element currently missing from our biodiversity management approach. Our current approach of trying to hang onto what we have (through mapping of remaining biodiversity sites, including SNAs) has not been effective.

We need a transformational change in our approach to one of large-scale habitat restoration and re-creation, underpinned by the re-establishment of ecological processes and ecosystem services (ES), for the benefit of people and wildlife. Modelling a future-focussed ecological network is an important component of being able to achieve the RPS objective for indigenous biodiversity:

The full range of ecosystem types, their extent and the indigenous biodiversity that those ecosystems can support, exist in a healthy and functional state.

This strategic component of the pilot provides the ecological protection and restoration framework within which current management can be co-ordinated and alignment with strategic priorities improved over time.

7.2.2 Additional eco-network analysis

Additional analyses were undertaken to provide landscape rankings of current and future priorities for terrestrial and freshwater biodiversity within the Waihou-Piako catchment. The future priorities analyses explored the use of a new corridor features within Zonation to identify locations in the landscape where restoration or creation of landscape linkages will maximise the future integrity of these ecosystems so as to sustain their life-supporting capacity.

Key components of the work were:

- Identify current landscape priorities for the conservation of indigenous biodiversity:

    1. Assemble and check terrestrial data – most of the required terrestrial data are already largely available, having been used in the Waikato Prioritisation project;

however, some checking will be carried out to resolve possible data inconsistencies identified during the latter project, and to include relevant information for sites in a 5km buffer surrounding the study catchment.

2. Add riverine and lacustrine data – the inclusion of freshwater ecosystems will require the addition of relevant spatial data from FENZ (DOC unpublished); some additional work may be required to ensure that upstream-downstream linkages between sub-catchments are accurately recorded.

3. Carry out ranking analyses – this will follow the same broad model used for the Waikato Prioritisation project, with the addition of (i) allowance for interactions between adjacent indigenous ecosystems and (ii) consideration of the effects of longitudinal connectivity along riverine ecosystems. Weightings to determine the relative influence of these two components will be refined iteratively in consultation with WRC staff.

- Identify future priorities:

  1. Include additional data describing the distributions of current land uses, land capability, land tenure and potential ecosystem cover.

  2. Implement analyses that extend the analysis of current priorities to demonstrate the identification of scenarios that would provide greater linkage between existing ecosystem fragments and improve the representation of a full range of native-dominated ecosystems.

7.2.3   Value to the programme/organisation

- Provides ecological network mapping based on robust science and expert modelling that is transferable to the whole region.

- Provides the basis for the ecological protection and restoration strategy that meets RPS Objective 3.19 and enables territorial authorities to undertake their biodiversity functions at a district scale more effectively.

- Provides a coherent picture to pull together a range of existing biodiversity projects (including those undertaken by WRC) and give them a clearer focus and enable improved co-ordination.

- Provides the ability to develop a shared biodiversity vision with stakeholders, focus where we need to work with others and agree how to proceed to achieve improved biodiversity outcomes.

- Provides the ability to prioritise WRC investment in biodiversity and guide the investment of others to deliver maximum benefit.

7.2.4   Potential applications

This tool provides an important decision support mechanism that can be utilised and applied to support a variety of work programmes and projects across WRC. It sets up the ability to identify who to work with so we can be proactive, identify willing partners and work collaboratively with them and support them to undertake biodiversity protection and restoration work. The model can be applied to assist projects with:

- Finding sites that favour public land or on land owned by WRC which contain under-represented habitats or important ecological connections. Once identified, WRC-managed land demonstration sites could be utilised to show-case ecological restoration best practice.

- Finding sites where willing landowners have been identified either as part of existing relationships with WRC staff (such as CMOs) or through this pilot project.

- Prioritisation of funding to the most important sites. The data available can identify habitat types that are most depleted (and therefore most rare) and locations that

provide for improved connectivity between habitats and prioritise these for funding (either from WRC or from other sources).

- Regulatory application of No Net Loss and biodiversity off-sets through regional and district plans. The ecological network modelling and data provides the ability to look at no net loss of habitats as required by the RPS. It identifies, to a level of detail currently missing, the strategic picture of habitat types, their locations in the landscape, and their extent remaining to enable robust consideration through resource consents.

- Using the ecological network data to be interrogated spatially to look at other opportunities. One potential option is to explore the development of a Regional Greenways System - a connected recreation and tourism trail that links ecological networks (existing habitats/sites and areas to be restored or re-created) with recreation and cycle trails and other tourism opportunities. Such a network can provide for a range of additional experiences for the users and a potential unique brand for the Waikato Cycle network, while development of cycle links and infrastructure can also provide for the establishment and restoration of habitats that are currently missing or under-represented in the Waikato.

7.2.5 Pathway forward into programme

Undertake a risk-based approach that focusses restoration at sites:

- On public land (see also demonstration sites)

- On private land with limitations for other economic uses (private land that is marginal to current farming operations)

- That would deliver other benefits (multi-benefit approach) such as riparian margins and water quality

- On private land where there are willing landowners (landowners who have a relationship with CMOs or those who have been engaged through the pilot project).

7.2.6 Key results and outputs

Key results arising from the ecological network analysis of restoration options for the Waihou Piako Zone:

- Prior to human arrival the Waihou-Piako supported a highly diverse range of indigenous ecosystems, mostly forests (80% of Zone) and wetlands (remainder).

  1. Hill country forests in the south and over much of the Kaimai Range were mostly composed of scattered large podocarps (rimu, miro, kahikatea, totara) emergent over canopies dominated by tawa; kohekohe was common at lower altitudes, northern rata at middle altitudes and tawari and kamahi or towai at higher altitudes;

  2. Small areas of beech and montane podocarps occurred on the highest peaks of the Kaimais, including Te Hanga and Te Aroha.

  3. Kauri forests were extensive in the north on the Coromandel, Kaimai and Hunua Ranges, sometimes growing in mixture with hard beech.

  4. Wetlands were extensive on the Hauraki Plains, forming deep deposits of peat;

  5. Mangroves occurred around the coast, extending up the lower reaches of coastal rivers and streams.

- Extensive modification of the vegetation pattern commenced with the arrival of Māori, and accelerated after European settlement — approximately three-quarters of the original indigenous cover has now been cleared.

- Clearance of the original indigenous vegetation cover targeted sites with high potential for agriculture, leading to almost complete loss of the indigenous forest ecosystems that were once extensive on the Hauraki Plains.

1. Well drained soils on the Hauraki Plains once supported forests dominated by totara and matai, estimated to extend across nearly 27,500 ha; these have been reduced to less than 1% of their original extent;

2. Less well drained soils on the Hauraki Plains once supported forests dominated by kahikatea and pukatea, occurring in a mosaic with wetlands, and covering around 95,000 ha; these have been reduced to approximately 1.5% of their original extent;

3. Wetlands have fared better on the Hauraki Plains through the retention of the Kopuatai Peat Dome, which is over 10,000 ha in extent;

4. By contrast, most forest ecosystems of hill-country environments retain 20% or more of their original extent; those occurring at higher elevations often retain 80% or more; however, most kauri forests have been modified by logging.

- WRC goals (RPS Objective 3.19) for the protection of biodiversity identify as a high level goal the desirability of maintaining representation of a full range of the indigenous ecosystems that once occurred in the Waihou-Piako;

    1. A threshold of 20% survival of the estimated original extent of each ecosystem type is generally accepted as providing adequate representation for biodiversity conservation purposes;

    2. Many of the indigenous ecosystems that occurred in the Waihou-Piako still survive across a sufficient area to meet this conservation goal; those failing to meet this goal mostly occurred historically on soils well suited to agriculture;

    3. Representation of those ecosystems that have been most diminished will require active restoration if goals related to their conservation are to be met.

- Spatial conservation prioritisation tools have been used to identify sites where restoration would be best implemented to increase those ecosystems most reduced in extent within the Waihou-Piako.

    1. These analyses take account of connectivity between surviving pieces of indigenous ecosystems, favouring sites that are diverse and well connected to other ecosystem fragments.

    2. When selecting restoration sites, these analyses can also account for the productive potential of sites identified for restoration, allowing varying degrees of avoidance of those with the highest potential for agricultural production.

    3. Results indicate that restoration to increase the extent of totara-matai forest and kahikatea-pukatea forest would require use of land with high productive potential.

    4. Restricting restoration to sites with low potential for agricultural production would not contribute substantially to increased achievement of regional biodiversity conservation goals to increase forest ecosystems that are already adequately represented within the Waihou-Piako.

Given the economic costs of using high productivity land for the restoration of totara-matai forests and kahikatea-pukatea forests, gains in the representation of these ecosystems will most likely be achieved through identification of suitable sites that are either (i) in public ownership, (ii) have other limitations that constrain or prevent economic uses, or (iii) would deliver other important benefits (e.g., riparian protection or water quality).

Table entries (Table 4 below) indicate the historic extent of each ecosystem, its representation in surviving primary and secondary indigenous-dominated cover (indigenous (%)), and its representation assuming restoration of new sites to expand indigenous-dominated cover by 5.6% so that it totals 30% of the Zone. Six different restoration scenarios are calculated with gradually increasing penalties on the inclusion of land with high productive potential, controlled through use of negative weights of increasing magnitude; LUC0 indicates a zero weight, LUC5 indicates a weight of -5, LUC10 indicates a weight of -10, etc. Values in the second to last row indicate the mean land-use capability class of sites selected for restoration. Estimates of ecosystem representation falling below 20% are highlighted in bold. Shading indicates

ecosystems whose representation increases (green) or decreases (red) by 500 ha or more, as land-use capability considerations increasingly constrain site selection.

Table 4: Representation of indigenous ecosystems in the Waihou-Piako Zone under different restoration scenarios.

Ecosystem	Historic (ha)	Indigenous (%)	Restoration of 5.6% to reach 30% indigenous cover					
			LUC0	LUC5	LUC10	LUC20	LUC50	LUC100
CDF4-1, Hall's totara, pahautea, kamahi forest	44.1	97.8	100.0	100.0	100.0	100.0	100.0	100.0
CDF4-4, Pink pine, pahautea forest	1,867.7	95.3	95.3	95.3	95.3	95.6	97.4	97.7
CDF7, Mountain beech, silver beech, montane podocarp forest	241.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0
CLF11, Silver beech forest	902.9	99.4	99.4	99.4	99.4	99.9	99.9	100.0
CLF11-3, Silver beech, kamahi forest	100.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0
MF7-1, Tawa mangeao forest	31,121.2	34.0	34.2	34.3	34.4	35.3	48.5	48.7
MF7-2, Rata, Tawa, kamahi, podocarp forest	25,340.3	49.0	49.0	49.1	49.1	49.9	54.4	55.0
MF7-3, Tawa, pukatea, podocarp forest	835.1	71.4	78.5	80.9	89.1	98.7	98.5	98.6
MF8-1, Kamahi, broadleaved, podocarp forest	2.4	100.0	100.0	100.0	100.0	100.0	100.0	100.0
MF10, Totara, matai, kahikatea forest	4,457.4	7.2	39.6	45.8	66.5	66.3	61.2	61.0
MF11, Rimu forest	31.4	92.6	100.0	100.0	100.0	100.0	100.0	100.0
MF20, Hard beech forest	501.6	43.9	100.0	100.0	100.0	100.0	94.3	94.0
MF22, Tawa, rimu, northern rata, beech forest	548.2	83.0	89.3	89.5	89.4	92.9	91.9	91.8
MF24, Rimu, towai forest	2,562.0	98.3	98.3	98.3	98.3	98.4	98.6	99.8
MF25, Kauri, towai, rata, montane podocarp forest	247.4	99.0	100.0	100.0	100.0	100.0	100.0	100.0
WF2, Totara, matai, ribbonwood forest	27,544.4	**0.9**	25.6	24.0	21.9	**19.5**	**6.8**	**4.2**
WF4, Pohutukawa, puriri, broadleaved forest	2,104.2	12.0	100.0	100.0	100.0	100.0	48.9	25.7

WF5, Totara, kanuka, broadleaved forest	482.2	**1.7**	100.0	100.0	100.0	100.0	100.0	100.0
WF7-2, Puriri, taraire forest	129.4	**6.6**	100.0	100.0	100.0	100.0	100.0	100.0
WF7-3, Kahikatea, puriri forest	412.2	44.6	99.3	99.3	99.3	99.3	99.3	99.3
WF8, Kahikatea, pukatea forest/Swamp mosaic	95,306.2	1.5	**11.2**	**11.3**	**10.8**	**10.4**	**5.1**	**4.3**
WF9, Taraire, tawa podocarp forest	52.0	94.8	100.0	100.0	100.0	100.0	100.0	100.0
WF11-2, Kauri, podocarp, tawa forest	50,168.7	54.0	54.0	54.0	54.0	54.2	57.9	59.1
WF12, Kauri, podocarp, broadleaved beech forest	16,444.2	40.0	40.0	40.0	40.0	40.1	40.6	46.3
WF13, Tawa, kohekohe, rewarewa, hinau, podocarp forest	99,854.7	17.7	**17.7**	**17.7**	**17.7**	**17.8**	20.4	20.6
WetlandSaline	496.5	45.4	53.3	53.3	53.3	84.5	84.5	91.4
			100.0	100.0	100.0	100.0	100.0	100.0
WetlandFen	477.0	**0.2**	100.0	100.0	100.0	100.0	100.0	100.0
WetlandSwamp	2,845.7	73.7	93.4	93.5	93.6	98.9	87.0	87.4
WL2, Manuka, greater wire rush restiad rushland	11,059.6	21.5	21.5	21.5	21.5	21.5	24.0	24.0
WL3, Bamboo rush, greater wire rush restiad rushland	15,892.0	46.7	46.7	46.7	46.7	46.7	47.0	47.0
Landuse capability (mean)			2.8	3.4	3.7	4.0	6.0	6.3
Total/Overall	391,596	24.5	**30.0**	**30.0**	**30.0**	**30.0**	**30.0**	**30.0**
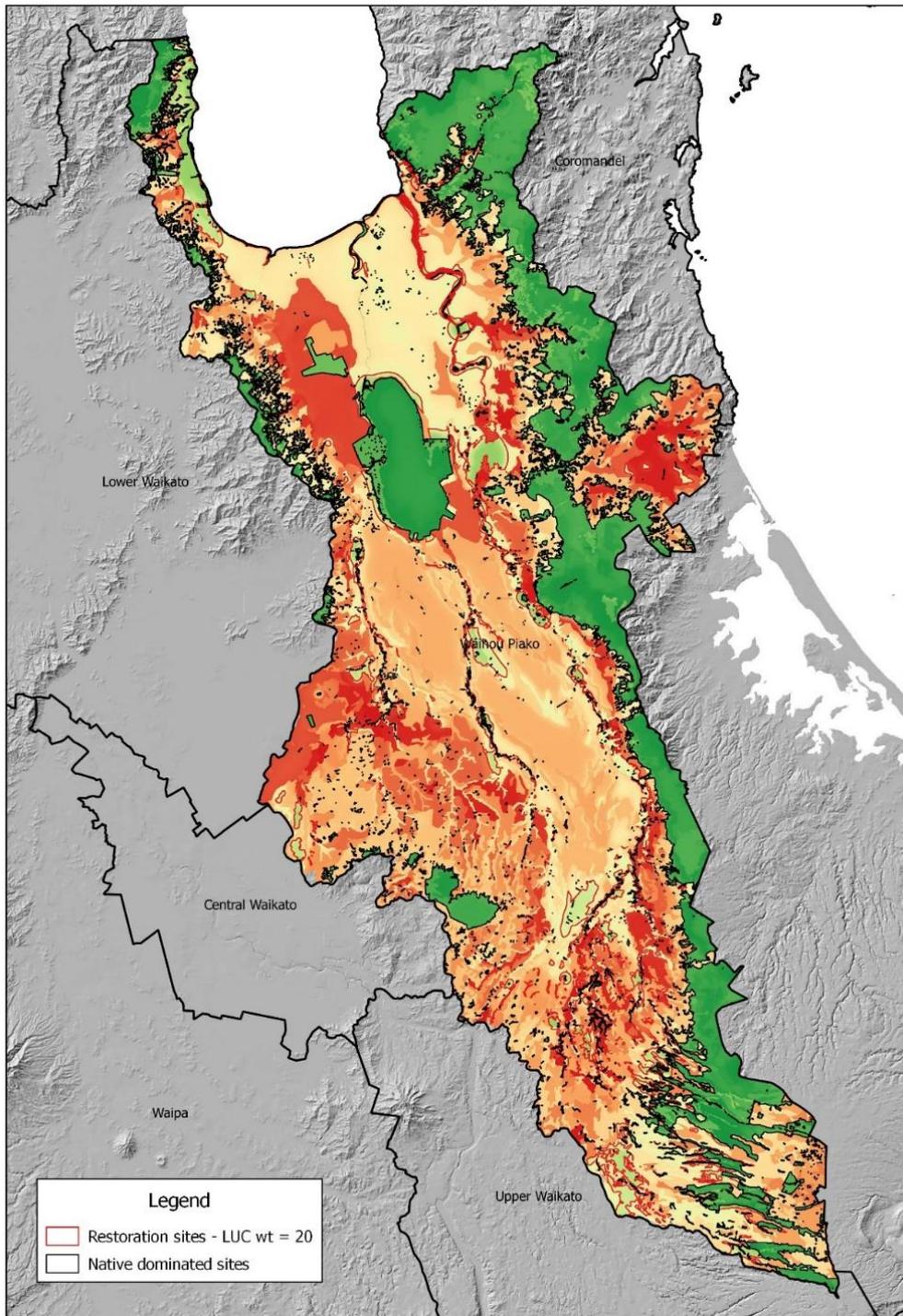
Figure 11: Indigenous biodiversity priorities for the Waihou-Piako Zone

This map has been calculated from a Zonation analysis using a land-use capability layer with a weight of - 20. Green colours indicate high priorities and red colours low priorities. Existing indigenous-dominated sites, both primary and secondary are delineated by black polygon outlines; exotic dominated sites offering the greatest potential to complement surviving indigenous-dominated ecosystems if restored are delineated by red polygons.

7.3   Tool 2 – farm system modelling

7.3.1   Farm system modelling

During the set-up of the LIBS pilot project, the project team was able to procure the services of Estelle Dominati from AgResearch as part of aligned core funded research (the Resilient Rural Communities Programme). The LIBS Pilot provided AgResearch the ability to practically apply

the modelling approach. This enabled Estelle to provide on-farm modelling at a site within the pilot area at no cost to the project.

The goal of the modelling was to:

Demonstrate to land owners that increased farm performance is achievable alongside biodiversity restoration and management, some farm optimization modelling was realised on a Tirau sheep and beef farm.

7.3.2   Tool and methods

Farm optimization modelling was realised with the Integrated Farm Optimisation and Resource Allocation Model (INFORM) from AgResearch on a Tirau sheep and beef farm. The INFORM model (Rendel et al., 2013, Rendel et al., 2015) is a new generation farm systems model that integrates independently obtained biological data from each of the land management units (similar natural resources and management practices) within the farm system. The optimisation routine uses the information from each land management unit to identify the mix of production enterprises and management regimes that maximise profit (earnings before interest, depreciation, taxes and amortization (EBIDTA)) for the business. The ability exists within the modelling framework to also place constraints or boundaries on the use or emissions from each land management unit before optimising EBIDTA, which represents a step change over the current approach which first explores economic outcome(s) and then mitigates for specific emissions (e.g. N, P, or Green House Gases (GHGs)).

The model was run on a Tirau sheep and beef farm covering 480ha (450ha effective), where 42ha have been identified as potentially eligible for biodiversity restoration, covering a mix of riparian margins, wetland restoration and regeneration of native bush remnants.

The optimisation model was run to maximise profit for the pastoral part of the business, first on the basis of the current effective pastoral area and land management unit mix (scenario 1), then re-run while taking out the 42ha of potential area for biodiversity restoration (scenario 2). For each of these two scenarios, animal numbers, grazing regime and profit were generated by INFORM.

As INFORM does not output environmental footprints of optimised farm systems, the OVERSEEER® nutrient budget was then used, based on the optimal systems generated by INFORM, using animal numbers from INFORM to model N, P and GHG losses from the two scenarios as well as the current farm system.

7.3.3   Results

Table 5:   Presents the results for the three farm systems considered in the study

	Current farm	Scenario 1	Scenario 2
Effective pastoral area (ha)	450	450	408
Stock units/ha	12.7	13.9	14.4
EBITDA ($/year)	193,157	264,875	251,334
EBITDA/ha of pastoral land ($/ha/yr)	429.24	588.61	615.92
Difference from current EBITDA/ha	NA	+37%	+43%
Ewe numbers	2443	2,485	2,338
Finishing lambs numbers	3350	2,598	2,444
Ewe hoggets	467	516	487
Breeding cows	192	460.0	437.0
R1	146	91.0	81.0
Other cattle	223	89.0	80.0

The optimisation of the farm system showed a potential increase in EBITDA/ha coming from the pastoral area of the farm by 37% (Table 5) by changing the sheep to cattle ratio of the farm from 48:52 to 45:55, optimising pasture utilisation over the year and abandoning forage cropping. If 42ha of marginal land is taken out of pasture for biodiversity restoration, including riparian margins, native bush remnants regeneration and replanting, the potential increase in EBITDA/ha of pastoral land calculated using INFORM could go up to 43% above current. This is due to savings made by retiring marginal land to fertiliser, weeds, and animal running costs. This does not include the costs of fencing and planting retired areas, nor the costs associated with management of newly retired areas (pests and weeds).

Figure 12 presents the environmental outcomes modelled using OVERSEER® of the three systems considered. For scenario 1, because of an increase in stocking rate from 12.7 SU/ha to 13.9 SU/ha, N losses for the whole farm went up 12%, P losses didn't change and GHG losses went up 30% (due mainly to the increase in cow numbers). For scenario two, N losses for the whole farm went up 6% from current system, P losses decreases by 14% and GHG losses went up 24%. The whole area retired was set up as regenerative bush in OVERSEER®. Having part of it set up as wetlands could make a difference to the OVERSEER® outputs for N loss from the whole farm.
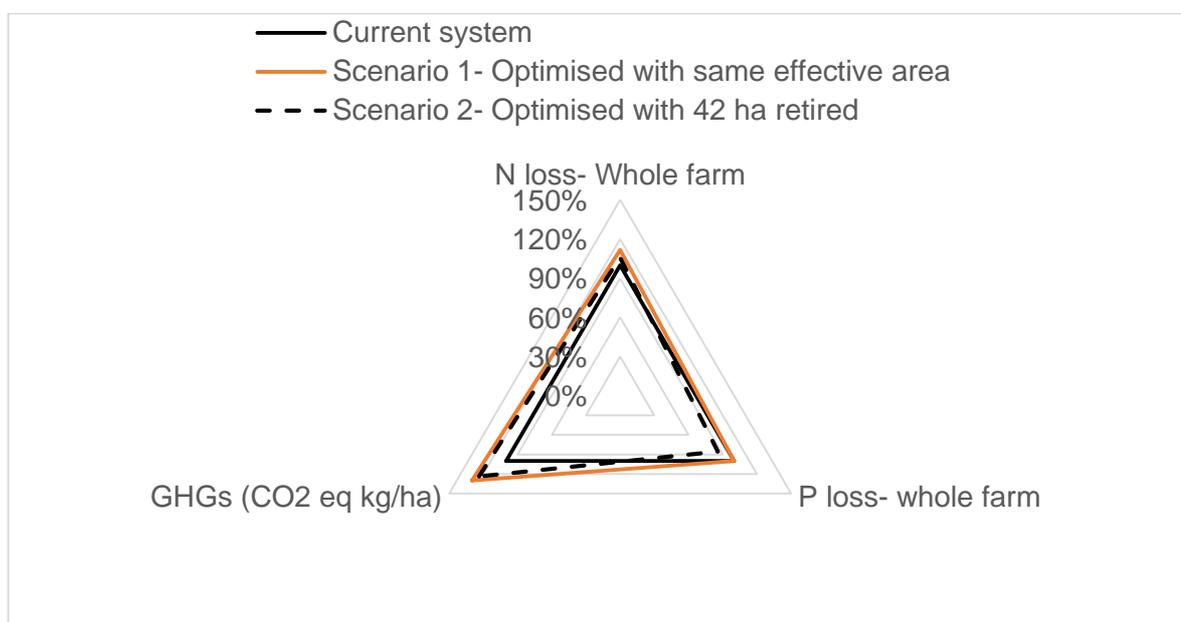
Figure 12: Relative environmental impacts of the two optimised systems modelled compared to the current farm system.

The modelling done in this study only concerns the pastoral area, and the financial and environmental impacts of taking 42ha of pasture off for biodiversity restoration. We did not model the actual impacts of the restored ecosystems (riparian, native bush) on ES including water quality, in-stream biodiversity, GHG mitigation or on representativeness of species reintroduced, connectivity, pest control. To have a complete picture of the impacts of biodiversity restoration this should be done in more detail.

7.3.4   Alignment/funding

Funding for the farm system optimisation modelling came from AgResearch core funded programme Resilient Rural communities. This programme has been aligned to the national Land and Water Science Challenge, as it was identified to fill gaps in the challenge around social science and farm system science.

7.3.5   Pathway into the LIBS programme

- Additional scenarios could be examined for the farm used in this study such as feasibility for manuka production on more land taken out of pasture. This could deliver additional

desired outcomes to LIBS as manuka is a valuable nursery plant for native bush restoration.

- The approach used in the farm system modeling here could be used as an example to investigate how to design farm plans in the future, which would cater to business performance goals as well as multiple ES goals. This approach could be applied to more (and different) farms within the scope of the LIBS programme.

- The existing relationship between WRC and AgResearch core funded Resilient Rural Communities program facilitates the availability of other tools for the LIBS program such as the RF-MAS model. RF-MAS is a model of regional land use that combines data on the natural resource base, existing and potential land uses and farmer behavior. This model could be used to test different roll-out options for the biodiversity strategy, and is able to incorporate optimised farm systems.

- Explore the use of drone technology as a tool to assist in farm planning and modelling enabling a comprehensive multi-benefit assessment using a natural capita/ES approach with potential added value from aggregation and analysis of digital data (multi farm plan to catchment scale), visual 3D technology and "flyovers" as effective communication tools (especially for ecological corridor type concepts).

7.4   Tool 3 – monitoring framework

The pilot project assessed the need for and ability to implement a monitoring framework which is captured in Part 8 of the report.

7.4.1   Value to the organisation & pathway into the LIBS programme

- The pilot project established that an ecosystems services framework would be a useful way to measure and communicate multiple benefits from biodiversity restoration but that any development of such a framework should be linked to work that is being undertaken at a broader level within the organisation as part of assessing how we measure progress against our strategic direction and links to regional development (and green growth). Practical application of this work can be linked into the LIBS programme (over next three years).

- The Regional Ecological Monitoring of Streams (REMS) system already provides the framework for monitoring aquatic biodiversity, including baseline monitoring. Appropriate aquatic biodiversity targets could be developed and linked to this programme.

- Monitoring terrestrial biodiversity is a current gap. In order to meet our biodiversity reporting requirements, the development of such a system needs to be considered.

- There is strong potential to deliver both Mātauranga Māori and citizen science monitoring elements alongside the REMS approach for aquatic biodiversity, as long as this is set up correctly.

- Of the current terrestrial biodiversity indicators, the fragmentation indicator is the most useful as it provides important data around achieving connectivity between habitats – a key component of ecosystem health. In addition the data from the ecological network modelling can inform indications around habitat representation and be used to set targets and monitor progress around this important indicator.

7.5   Tool 4 – community engagement

The pilot project developed and implemented a community engagement process that focussed at the grass roots, building on lessons learned and experience gained by landowners. It developed a focussed stakeholder register and management plan, and a stocktake of engagement activity and opportunities. Community networks of existing eco-champions were

mapped and relationships with other agencies and industry were built. Cross-WRC engagement and identification of complementary activity across different directorates was undertaken.

7.5.1 Value to the programme/organisation

- Undertook a community engagement approach in order to understand resource requirements for the LIBS programme

- Tested the grass-roots engagement and capacity building process with landowners, land managers and other key stakeholders

- Captured information on existing biodiversity enhancement projects and programmes and assessed how this information can be communicated via the programme better (e.g. website) and co-ordinated more effectively

- Invested in relationships and partnerships with the variety of stakeholders who have responsibilities to manage biodiversity as first step toward improved co-ordination of activities

- Highlighted opportunities to co-ordinate WRC-related biodiversity activity

- Began the development of a shared WRC/stakeholder biodiversity vision to focus where and how we need to work with others

- Provided a draft matrix of locally-relevant tools, to be further assessed for social acceptability and economic viability through the programme

- Shared stories that highlight how biodiversity management underpins people's wellbeing and acts as a catalyst for investment in local communities

- Highlighted opportunities to add value and share resources, avoid duplication of management, and to identify any gaps

- Increased understanding and awareness of needs and aspirations of landowners, land managers, councils and other agencies with respect to biodiversity and how it may be incorporated into land management operations

- Increased support from participants, stakeholders and territorial authoritiess for indigenous biodiversity

- Highlighted and strengthened the education, training and research opportunities associated with a cohesive community-led restoration programme.

7.5.2 Pathway into the LIBS programme

A range of mechanisms are required to build on the partnerships developed within the pilot project and to further invest in some of the relationships with a range of stakeholders as this work evolved. Co-ordinating activity, sharing resources and building capacity and awareness in this way is a key outcome of the LIBS approach [see Appendix 5].and needs to be extended through year one of the programme.

7.5.2.1 Further co-ordination and integration with WRC activities

Further work on coordinating the internal activities regarding biodiversity would maximise the efficiency of the WRC biodiversity programme and provide support to elicit some quick and easy gains in year one of the programme. A range of programmes and projects are already identified [see section 3.6] such as catchment works and opportunities for biodiversity enhancement on WRC scheme land.

The poplar and willow removal/riparian management programme is a good example as it aligns well with the multi value/multi stakeholder LIBS approach. This programme currently involves over 30 landowners in riparian stream restoration over 35km of streams along the Waiomu, Kakahu and Oraka Streams. The planting is undertaken to achieve 7km of planting per year guided by a multi working party strategy which considers biodiversity, water quality, cultural and recreational values.

7.5.2.2 Integrate and co-ordinate complementary activities of other agencies

The LIBS framework envisaged the integration of biodiversity into both production lands (e.g. forestry, farming) and urban environments. Weaving conservation principles into sustainable land management practices will rely on strong alignment with existing initiatives such as Forest Stewardship Certification, and Sustainable Dairying Water Accord, local initiatives such as the Upper Waikato Sustainable Milk Project and exploration of new options including Greenways, carbon farming, and honey production. An identified ecological network can provide a coherent picture to pull together a range of existing projects (including those undertaken by WRC) and give them a clearer focus. [See Table 6].

Table 6: Key stakeholders with complementary activities

Other Stakeholders	Tools
Territorial authorities	Funding, community and economic development, policy and regulation, economic incentives,
Forest and Bird	Land for Wildlife Programme
Fonterra	Fencing and planting programmes (mainly for water q)
DairyNZ	Upper Waikato Sustainable Milk Plans, fencing and planting initiatives, riparian planting tool.
Dairy Industry	Sustainable Dairy and Water Accord – Identification and protection of significant wetlands (stock exclusion)
Forestry, Hancock Forest Management	Forest Stewardship Certification; Forest Harvest Management Plans, wetland & other biodiversity enhancement projects
Greenfleet NZ	Carbon offset contribution from clients to fund planting of biodiverse forests.
WINTEC	3 kete vision for science-based programmes
Toimata Foundation	Enviro Schools – Trees for Survival
South Waikato River Trails	Cycle trail planting and habitat enhancement, future cycle trail feasibility
Ngati Haua Mahi Trust	Sustainable training and employment linked to ecological restoration.
QEII & NWR	Covenants, funding and support
Ngati Hinerangi	Support for site-based, culturally appropriate ecological restoration.
Raukawa Charitable Trust	Iwi Environmental Management Plans – shared outcome delivery and delivery with marae partnerships.
Kaimai Forum	Biodiversity a key objective of their strategic plan.
DOC	Mokaihaha Recovery Project, Kaimai Forum and Living Waters Project. Test the partnership model for delivering more conservation.

7.5.2.3 Undertake further stakeholder workshops

To build on the investment to date with other stakeholders and involve additional stakeholders who were willing but unable to attend the first multi-stakeholder workshop, further workshops should be held and focus on:

- further stocktake of existing activity

- identification of key contacts

- identification of different tools

- opportunities to look at co-ordination and avoid duplication of activities

- spatial mapping underpinned by the ecological network modelling data

7.5.2.4 Refine the draft tools matrix

The most appropriate mix of tools based on feedback from the workshops can be assessed as the LIBS programme progresses, and at the end of year one, a suite of tools will be selected and identified as short, medium or long-term actions to be applied as part of a co-ordinated implementation programme. Assess the options for how the work can be co-ordinated going forward and how this would be funded. Consider **a joint-funding model option** based on the Waikato Biodiversity Forum model, where a regional co-ordinator is jointly funded by regional and district councils and DOC. Look to extend the joint funding model to include other stakeholders such as industry.

Some of the key tools identified through the pilot that came out strongly during the engagement processes included a range of tools to support on-farm biodiversity enhancements such as **farm or property plans**. These plans provide an opportunity to integrate the management of water, soil, biodiversity and farm profitability into the one plan. Landowners had no appetite for dealing with these matters separately, they wanted to do it once and cover everything.

Other tools will be required for land that is not farmed, for example the extensive production forestry lands in the upper part of the pilot area. In this instance tools such as **Forest Harvest Management Plans** may be the appropriate tool to deliver the forest profitability and biodiversity enhancement integration opportunities.

A lot of anecdotal evidence emerged from the pilot around reducing the amount of land in production and retaining (or improving) farm profitability through retiring (often marginal land) and undertaking biodiversity enhancement, and/or other potential land use options such as carbon farming or manuka honey production. These win-win approaches can be tested through **on-farm modelling**. One example farm was modelled in this way by AgResearch using the INFORM model as part of the pilot project to demonstrate to land owners that increase farm performance is achievable alongside biodiversity restoration and management. Further on-farm modelling work in partnership with other agencies should be assessed as part of the programme, especially for different types of farming (dairy, sheep and beef).

The LIBS approach can provide the biodiversity lens for **Integrated Catchment Plans.** These plans are an important "integrating" tool, linking soil, water, biodiversity and farm management. They can also be used to integrate multiple farm or property plans up to a catchment scale to look at aggregation + impacts + biodiversity (corridors/representation) in the catchment as a whole.

7.6   Tool 5 – marae-based engagement

The pilot project developed and implemented a flax-roots engagement process with hapu and marae of Ngati Hinerangi that built on lessons learned and experience gained by mana whenua, their needs and aspirations and capacity building requirements with respect to biodiversity. It assessed some culturally relevant tools to reduce biodiversity decline and align Mātauranga Māori and kaitiakitanga principles and developed the marae model as a potential exemplar to share with other marae within the pilot area.

7.6.1   Value to the programme/organisation

- Tested a holistic approach with mana whenua to sustain indigenous biodiversity and maintain their cultural relationship with it.

- Tested the marae-based engagement and capacity building programme in order to understand resources required for the LIBS programme.

- Invested in relationships and partnerships with whanau who hold mana whenua.

- Provided opportunity to understand the significance of Mātauranga Māori and the potential for practical application of it.

- Provided some learning around incorporation of Mahinga Kai and Rongoa Māori into ecological restoration frameworks.

- Provided a potential co-management model for WRC prior to Treaty Settlement finalisation.

7.6.2 Pathway into the LIBS programme

- Finalise the **on-line survey** and complete and analyse the findings of that survey in association with Ngati Hinerangi.
- **Build on the informal partnership with Ngati Hinerangi** and formalise this commitment moving into the programme, alongside MPDC.
- Undertake further **Hui and Wananga** to clarify options, scope and opportunities around developing an **Ecological Restoration Strategy** for their Rohe. Consider options for alignment with Catchment Management Planning assisted by WRC and assess potential of an ecological and cultural approach to provide for cultural/eco-tourism opportunities. Describe the potential for development of education and training pathways for Māori linked to marae-based ecological restoration programme and consider/assess culturally appropriate options for pest and weeds control in association with WRC biosecurity staff.
- Consider potential **models for long-term co-ordination** of marae-based ecological restoration activities including existing marae-based environmental programmes such as the Para Kore (waste-reduction) programme. This programme is largely funded by Ministry for the Environment (MfE) through its Waste Minimisation Fund and provides resource for part-time co-ordinators.
- Pare Kore came into being through a series of hui facilitated by WRC in late 2008 to look at waste minimisation and resource recovery on marae. A scoping paper was created to explore options to develop a pilot programme in the Waikato region. The report recommended that Xtreme Waste apply to the Sustainable Management Fund to pilot a marae recycling programme in the Waikato. This application was successful and since then 117 marae from across New Zealand are now involved in this programme.

7.7 Tool 6 – funding and investment

7.7.1 Integrated funding model

During the pilot project considerable discussion was undertaken about developing a robust funding model for when the LIBS programme moved into its implementation phase. The LIBS programme could potentially utilise an integrated funding approach which breaks down the programme into key elements within each of its four indices – Social, Cultural, Environmental and Economic, and then identify funders who can potentially support sub elements of the programme [projects] which meet the funders' needs and criteria. Work force development could thus be supported by agencies that fund education, training, employment and capacity building, giving the programme four options for funding support within but one strand of the programme.

Skill and time will be required in making integrated funding applications, but when done well, interagency funding support can be achieved. The integrated funding approach then looks at how quid pro quo funding from the corporate sector can be applied to supplement the funds drawn in from government and the community in-kind support evident within the programme.

Initial seed funding from WRC and territorial authorities is able to be leveraged many fold in this manner, providing significant returns to Council and the community from a small initial investment [see Table 7].

The LIBS programme has been allocated $175,000 per year for three years (LTP). SWDC has confirmed their contribution to the programme of $45,000 over three years. The Programme therefore has overall funding of $200,000 in year one plus in-kind and staff support from other partners (Ngati Hinerangi, Raukawa Charitable Trust and MPDC). An outline of how funding is to be allocated across the key deliverables of the programme in year one and links to potential co-funding is provided in the funding model and year one work programme in table7 below.

7.7.2 Co-ordinated funding

Funding is available to landowners for activities that protect and enhance biodiversity from a number of sources. All local government agencies in the pilot area provide funding to enhance biodiversity but this funding is not co-ordinated across agencies nor is it especially targeted or prioritised. A key part of the LIBS approach is to look at improved co-ordination so that we can be more efficient with our existing funds, applying our collective funds strategically and without duplication.

One of the key messages from the community engagement process was that funding acts as a catalyst for on-farm biodiversity enhancement but the landowner still has to cover a significant amount of the costs of this themselves, and that funding often doesn't cover the landowners' time (however in the case of EPAs with WRC this is factored in).

A significant opportunity exists through the LIBS programme to prioritise funding to sites within the ecological network and align the funding of multiple parties to those priority sites to reduce the cost burden on landowners[4]. Initially this can be looked at across the local authority agencies (WRC, SWDC and MPDC) but expanded later to include other key stakeholders.

7.7.3 Funding from additional sources

Through the pilot project phase discussions have been undertaken with Greenfleet New Zealand – a not for profit proponent of biodiverse carbon planting projects – who are keen to look to partner with influential organisations such as WRC to further their aims. Greenfleet can bring corporate supporters who have chosen to offset their carbon emissions through the planting of biodiverse forests, while the WRC can bring a potential "land pipeline" or supply of landowners who are willing to retire land for planting. This has the potential to significantly reduce costs of biodiversity enhancement on private land currently falling to private landowners.

Greenfleet executive have agreed in principle that working alongside WRC on collaborative projects can aim to achieve outcomes for mutual benefit including:

a) the creation of biodiverse forests and re-vegetation of landscape

b) reduced salinity and erosion

c) improved water quality in rivers and streams

d) the provision of habitat for native wildlife

e) improved structural and functional connectivity of habitats

f) maintenance of the relationship that tangata whenua have with indigenous biodiversity.

To that end a draft memorandum of understanding (MOU) has been developed [see Appendix 6] between the parties for further discussion as we move into the LIBS programme phase.

7.7.4 Applied research investment

National Science Challenge – Biological Heritage

The pilot area provides a potential testing ground for applied research funds. Such funding may be available, for example, through the National Science Challenges (NSC) – especially the Biological Heritage NSC which has $26.5 million available over four years. This challenge is based on partnerships, integration and alignment. The LIBS framework is an integrating concept that can:

- Overcome divisions between natural and productions systems

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[4] It should be noted that there is a balance to be found here – between reducing costs to landowners, their buy-in to the process and long term sustainability of outcome, and protection of investment of public funds through some sort of legal agreement. The LIBS programme would look to ICM experience in managing landowner support and contributions and possible legal agreements or other mechanisms.

- Involve diverse parties and embed Māori and end users

- Provide for co-funding and align related funding streams

- Provide for research and development

- Identify and weigh up the multiple values of natural resources.

The LIBS pilot particular aligns with Theme 3 of the Science Challenge – Sustaining NC through resilient ecosystems and its focus on "a whole of system approach to sustaining NC through managing ecosystem resilience at multiple scales".

Moving into the LIBS programme this will be one of the key relationships that needs to be further developed, but strong connection already exists through former NSC Biological Heritage Interim Director – Bruce Clarkson.

Resilient Rural Communities Programme

Staff from AgResearch have already been involved in the LIBS pilot project via links to the Resilient Rural Communities Programme – a core funded AgResearch programme which has benefitted from being able to apply specific research work in the pilot area. This programme (and the work around ES frameworks and on-farm modelling) has been aligned to the Land and Water NSC. Further opportunities exist to leverage off this opportunity through the LIBS programme.

Integrated Constructed Wetlands (ICW) Programme

This Ministry of Business, Innovation and Employment (MBIE) funded Wetland programme co-ordinated through Landcare Research (Dr Bev Clarkson) is looking for potential partners and potential sites to demonstrate the multi-benefit approach to constructed wetlands. Wetlands can be existing but in a degraded state. There is strong alignment here to undertaking restoration on WRC scheme land and to identifying under-represented habitats for restoration and enhancement. Linking in to the ICW programme can leverage additional resources/benefits to the LIBS programme.

Regional development investment – Greenways

The delineation of ecological networks at a regional scale is something that has not been undertaken in New Zealand before. Delineation of ecological networks (green infrastructure) are not only important for managing our biodiversity resources more strategically. It also provides the ability to look at other infrastructure that requires a "network" view and that may be compatible with protection, enhancement and indeed re-creation of biodiversity and habitats.

Regional scale ecological network plans or restoration strategies can (and do) serve as a critical component of greenways and trail systems[5] that have important recreational, tourism and health outcomes as well as biodiversity or ecological outcomes. Development of regional and local cycle trails is an area of work that is currently interesting local councils, tourism agencies and others including central government, as a key part of local economic development.

There is a strong correlation between ecological networks (and sites) and recreational networks and activities, including cycling. For example, the Timber Trail in Pureora Forest and Te Awa within the Waikato River riparian margin.

The potential development of a Waikato Regional Greenways System could provide for a range of additional experiences for cycle users and a potential unique brand for the Waikato Cycle network, while development of cycle links and infrastructure can also provide for the establishment and restoration of habitats that are currently missing or under-represented in the Waikato.

During the pilot project discussions have been initiated with Glyn Wooller, General Manager South Waikato River Trails Trust, who has indicated an interest in looking at the potential

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[5] See for example, Florida Greenways and Trails System Plan – www.FloridaGreenwaysANDTrails.com

application of the ecological network modelling to underpin work on future cycle trail feasibility and opportunities.

7.7.5 LIBS work programme 2016-17 and integrated funding model (2016-2019)

Table 7: LIBS Work Programme 2016-17 and Integrated Funding Model (2016-2019)

PROGRAMME PLANNING	CAPACITY BUILDING & COMMUNITY CONSULTATION	STAKEHOLDER ENGAGEMENT & CO-ORDINATION	TECHNICAL WORK	PROGRAMME DELIVERY (year one)	PROGRAMME DELIVERY FUNDING (ongoing)	CORPORATE SUPPORT FUNDING (Year two onwards)
• Project structure • Advisory group costs • Project Mgt • Consultation & hui – Hinerangi & Raukawa • Stakeholder plan • Programme communications (web site etc)	• Evaluation of pilot engagement tools and selection for programme • Marae-based capacity building & engagement • Completion and analysis of on-line survey • Development of ecological restoration strategy • Engagement with Raukawa and marae • Options for co-ordination of marae-based biodiversity programmes	• Stakeholder workshops • Alignment of activities – within WRC, across stakeholders • Co-ordination of programmes • Options for resource sharing + funding co-ordination • Refinement of tools matrix + specific focus on key tools – property plans, catchment plans, forest plans etc • Opportunities for applied research investment e.g. NSC	• Application of ecological network modelling • Additional on-farm modelling • In-kind support from AgResearch • Aquatic ecological health citizen science/Mātauranga framework • Nest LIBS into ES framework and apply • Terrestrial indicators assessment	• Year one delivery of "low hanging fruit" + support for existing programmes (e.g. poplar/willow removal). • Additional $$ from internal WRC sources for priority projects – such as habitat restoration at priority sites on scheme land.	WRC and TA Funds (Natural Heritage & Regional Development) MfE Ministry of Primary Industries (MPI) DOC MBIE Te Puni Kokiri (TPK) & Ministry of Social Development (MSD) NWR World Wide Fund for nature (WWF) Raukawa Charitable Trust Ngati Hinerangi Greenfleet NZ Note: WRA and WCEET funding available within Waikato catchment post year one	Mighty River Power (MRP) Fonterra DairyNZ Infratil (Coke NZ) Philanthropics Trust Waikato WEL Energy Trust Brian Perry Charitable Trust D.V. Bryant Trust Tindall Foundation Momentum Foundation Next Foundation others
OUTCOME; The LIBS Year One Programme Strategy and project plan is developed. Multi agency project plan.	**OUTCOME;** Mana whenua and community are engaged, capacity building is underway and are contributing to the development of a functional LIBS programme.	**OUTCOME;** Key stakeholders are engaged, information on biodiversity activity has been shared and co-ordination of activity across organisations has been considered.	**OUTCOME;** The programme is supported by monitoring and application of ecological network model, on-farm modelling, Geographic Information System (GIS), mapping and spatial analysis.	**OUTCOME;** The LIBS programme supports existing biodiversity-related catchment work as part of alignment activities and WRC priority sites are funded for management as part of risk-based approach.	**OUTCOME;** A cross section of funders are engaged in the resourcing of the LIBS programme and in kind support is vested in the kaupapa by the community.	**OUTCOME;** A range of corporate funders have engaged in the programme and are matching the funding provided by the community and Govt – in a well-defined and concise manner.
LIBS PROGRAMME FUNDING WRC & SWDC (also MPDC in-kind). Also LIBS urban pilot project with HCC.	LIBS PROGRAMME FUNDING WRC & SWDC (also MPDC in-kind). Also LIBS urban pilot project with HCC.	LIBS PROGRAMME FUNDING WRC & SWDC + MPDC in-kind. Also LIBS urban pilot project with HCC.	LIBS PROGRAMME FUNDING WRC & SWDC + MPDC in kind. Also LIBS urban pilot project with HCC.	INTERNAL FUNDING →	INTERNAL + EXTERNAL FUNDING →	CORPORATE FUNDING →
DECEMBER 2016	JAN-JUN 2017 -	JAN-JUN2017	JAN –JUN 2017 -	JAN - JUNE 2017	JULY 2017 ONWARDS	JULY 2017 ONWARDS

8 Monitoring

8.1 Overview

Monitoring of progress over time and the setting of appropriate targets and milestones was a key element of the pilot. Workstream two of the LIBS Pilot Project highlighted the need for a comprehensive monitoring framework to reflect the multiple values-based approach to the project (environmental, social, economic, and cultural), the co-management approach used in engagement (workstream four) and the need to reflect the involvement of the local community in ongoing management and monitoring of biodiversity into the future.

Five key elements (deliverables) were identified for this workstream:

1. ES and multi-benefit approach: Develop and implement a method to quantify multiple benefits associated with biodiversity enhancement. Associated benefits will need to be identified, valued and communicated.

2. Terrestrial indicators and targets: Identify appropriate indicators and biodiversity management targets against which we can measure success or otherwise for terrestrial biodiversity.

3. Aquatic indicators and targets. Identify appropriate indicators and biodiversity management targets against which we can measure success or otherwise for aquatic biodiversity.

4. Mātauranga Māori: Include Mātauranga Māori into the monitoring framework through development and application of at least one practical example of a Mātauranga Māori indicator. Given mana whenua relationships to biodiversity at place, a framework for inclusion of Mātauranga Māori into and alongside existing scientific monitoring methods should be established. Provision should also be made for local monitoring of the indicator.

5. Citizen Science: Inclusion of citizen science monitoring techniques as an extension from the community-led engagement processes.

Given the short pilot project timeframe, any proposed monitoring approach required pragmatic goals regarding what could be achieved. The project plan identified a need to:

- Consider and incorporate existing programmes where appropriate and possible.

- Consider and incorporate external (e.g. DOC) or national ((Environmental Response Management Application) ERMA) monitoring programmes where appropriate and possible.

- Assess additional data requirements for baseline monitoring (what do we know about the pilot location, what is currently being measured, is it useful).

- Consider and incorporate existing monitoring methods involving citizen science and/or Mātauranga Māori where appropriate and possible.

- Utilise and build on the existing WRC Environmental Monitoring (EM) programme where appropriate and possible.

8.1.1 ES framework

Indicators and targets for aquatic and terrestrial biodiversity components need to be set within a framework that reflects the multiple supplementary benefits that can accrue from biodiversity restoration and protection. An ES framework provides a method to identify, value and communicate these benefits to the range of stakeholders involved in biodiversity management.

A related piece of work is underway within WRC which has the following purpose:

To describe the concepts of Natural Capital (NC) and ES and outline how a NC/ES approach could be useful for WRC.

The main drivers for this work are to provide a framework for reviewing WRC's Strategic Direction, and to measure progress against it. The framework uses a quadruple bottom line approach, including the importance of ecosystems and the services that they can provide as a key foundation underpinning regional development and opportunities around Green Growth. This approach also assists implementation of Objective 3.8 of the RPS (ES). Standardising an NC/ES method using the LIBS programme as a pilot/test case has been discussed as a useful complement to this work and it has been included as part of the technical workstream of year one of the LIBS work programme [see table 7]. The relationship between biodiversity, ES and regional wellbeing linked to the RPS objectives is outlined in Figure 13.
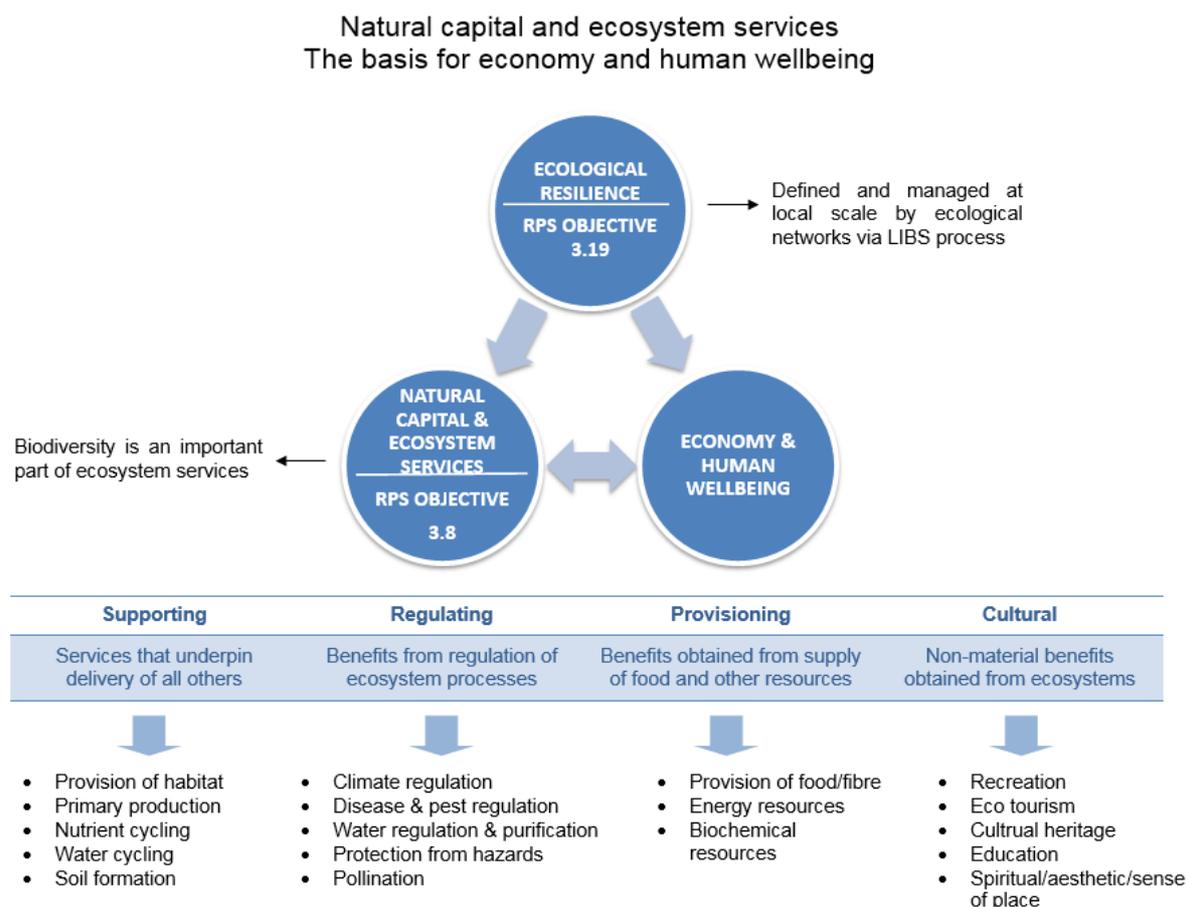

Figure 13:   The relationship between biodiversity, ES and regional wellbeing

8.1.2   ES and the Waikato region

Nature is an essential life-support for people's health and wellbeing and is the foundation for a prosperous economy, especially our heavily resource-based Waikato economy which is focussed on primary production and tourism. Our future prosperity will continue to rely on the flow of services provided by our natural environment.

8.1.3   Proposed way forward

The NC/ES framework can be used to organise WRC policy, science and operational activities as well as helping to raise the profile of environmental considerations during decision-making at all levels. Making the contribution of nature visible emphasises the importance of WRC role and functions.

The NC/ES approach will achieve this through:

1. Classifying and defining natural capital stocks (soil types, ecosystem types, land uses), and ES, including developing an agreed classification.

2. Identifying desired outcomes (such as desired levels of biodiversity, water and air quality levels etc)

3. Undertake a stocktake = current supply and resulting outcomes

   a. Characterising and describing current levels for the classified NC, land use, ES and outcome (What)

   b. Map the location and extent of NC/ES (Where)

4. Strategise – based on gap between supply and demand.

   a. Identify issues using stocktake

   b. Prioritise actions to match supply (use of the NC and resulting ES and outcomes) with demand (desired outcomes identified in step 2).

8.1.4   Classifying NC and ES

The first step includes identifying and agreeing on a list of natural capitals (natural resources, ecosystem types) land uses and associated services. This is based on internationally accepted standards in a New Zealand context.

Classifying stocks (natural resources, NC) at the highest level could include:

- Water

- Land

- Coast & Marine

- Biodiversity

- Air

A more detailed breakdown could include:

- Ecosystem types (e.g. for water stock above – rivers, streams, lakes, wetlands, groundwater, geothermal)

- NZ land cover database (LCDB)

- NZ land use data

- Biodiversity (Expected Current Ecosystems derived from the Biovegetation and Potential Ecosystem GIS layers) - Refer also RPS/WRC Technical Report: http://www.waikatoregion.govt.nz/tr201328/

Classifying flows of ES at the highest level could include:

- Provisioning ES

- Regulating ES

- Cultural ES

- (Supporting ES – *essential for and included in all other ES*)

PROVISIONING *Products obtained from ecosystems*	REGULATING *Benefits from regulation of ecosystem processes*	CULTURAL *Non-material benefits obtained from ecosystems*
Biochemical, natural medicines & pharmaceuticals Food & Fibre Freshwater Fuel Genetic Resources Ornamental Resources	Air Quality Maintenance Biological Control Climate Regulation Erosion Control Human Disease Regulation Pollination Storm Protection Water Purification Water Regulation	Aesthetic Values Cultural Heritage Values Cultural Diversity Educational Values Inspiration Knowledge Systems Recreation & Ecotourism Sense of Place Spiritual & Religious Values Social Relations
SUPPORTING *Services necessary for the production of all other ecosystem services*		
Nutrient & water cycling Primary production Production of atmospheric oxygen	Provisioning of habitat Soil formation & retention	

Table 8:   High-level ES framework for New Zealand

8.1.5   Identify desired outcomes

Use regional indicators currently monitored:

- desired water and air quality levels,

- sustainable fish population levels,

- biodiversity levels,

- social and cultural desired outcomes

8.1.6   Stocktake: Characterisation (description) of NC and ES

The characterisation of NC and ES is a staged and hierarchical process, starting at the higher level and adding further details depending on the purpose, issue and scale of a project.

➔ Natural Capital				
ES ⬇	Water	Land	Coast/Marine	Biodiversity
Provisioning - **Milk Production**				
Regulating - **Carbon Sequestration**				
Cultural - **Recreation**				

Table 9:   Possible matrix to assist description of NC and ES

The process includes:

- Filling in a matrix of NCs versus ES (at an appropriate level of detail) – initially a tick list ☑

- Identifying the key/priority NC and ES and defining/describing what these are.

- Gathering data and information about the identified key/priority NC/ES – this includes (spatial) extent, quantity and quality/condition, and any data on change (trends).

- Highlight any gaps

8.1.7   Mapping of NC and ES

The geographical (spatial) extent of stocks (ecosystem types) is relatively straight forward. Mapping of ES is more difficult, especially for regulating and cultural ES. Many provisioning ES have been mapped (e.g. milk solid production, fibre/timber production).

8.1.8   Strategise

The next steps will need to look at what may be desirable (improved ES provision), and explore options for improving levels/range of services (flows).

1. Identify issues using stocktake

2. Prioritise actions to match supply (use of the NC and resulting ES and outcomes) with demand (desired outcomes identified in step two)

3. Review current initiatives and policies and assess how well they address the issues identified in two.

4. Prioritise for new initiatives/policies.

8.2   Terrestrial indicators and targets

8.2.1   Background

WRC currently has no standardised regional ecological monitoring approach for terrestrial ecosystems, unlike for streams [see below]. This makes it very difficult to measure and determine the condition (or health) of terrestrial ecosystems in the region over time. This is a key limitation when attempting to measure progress towards meeting the RPS biodiversity objective:

The full range of ecosystem types, their extent and the indigenous biodiversity that those ecosystems can support exist in a healthy and functional state.

8.2.2   Current indicators

Existing WRC indicators for monitoring terrestrial biodiversity include:

a) Extent of indigenous vegetation on land;

b) Forest fragmentation; and

c) Indigenous coverage of protected areas.

Although a) above covers extent it doesn't do so in terms of the full range of ecosystem types. Part b) is useful in terms of measuring connectivity between habitats which can be a measure that reflects both health and functioning of ecosystems. It may also be useful for extending ecological networks.

8.2.3   National/regional monitoring and reporting requirements

Revised and improved SOE monitoring for terrestrial ecosystems and wetlands is being strongly signalled through the Environmental Reporting Act (2015) and the Regional Biodiversity Managers Biodiversity Forum (consisting of all regional councils). This group requested that Landcare Research develop a framework and suite of indicators for monitoring terrestrial biodiversity status and trends, in relation to core activities and responsibilities of regional government.

An important goal of this project was to achieve a good level of compatibility among regional council activities and those of other organisations involved in biodiversity monitoring. This was assisted by information from DOC in its Natural Heritage Management System. Indicators were also assessed against the Environmental Performance Indicators developed for terrestrial biodiversity by MfE (1998).

This work has identified ten indicators and 18 measures. Three measures have reports complete, these are:

- M1 (Indigenous landcover (ha, %) of cover classes, habitat types, across LENZ and Eco District units, region)
- M11 (Change in temperature and precipitation)
- M18 (Area and type of biodiversity protection achieved on private land)

Four measures are ready for reporting, but require biosecurity desktop collation and analysis. These are:

- M6 (Number of new naturalisations)
- M15 (Indigenous ecosystems released from vertebrate pests)
- M19 (Contribution of initiatives to (i) species translocations and (ii) habitat restoration)
- M20 (Community contribution to weed and animal pest control and reductions)

Two measures are being worked on with DoC to complete. These are:

- M5 (Vulnerable ecosystems)
- M12 (Change in protection (area and type) of naturally uncommon ecosystems)

Two measures are being worked on with the EMAR land group to develop. These are:

- M8 (Change in area under intensive land use)
- M9 (Habitat and vegetation loss)

Three measures are at the peer review stage. These are:

- M13 (Threatened species habitat)
- M14 (Vegetation consents compliance)
- M17 (Extent of indigenous cover in water catchment)

Four measures are stage 2 dependent and these last four are the most contentious as they require use of the 8x8km plot network. To date only Auckland Council and Greater Wellington have implemented the plot network. Further analysis is required for WRC (and other regional councils) as to the cost effectiveness and usefulness of these measures. These four measures are:

- M2 (Vegetation structure and composition)
- M3 (Avian representation)
- M7 (Distribution and abundance (pests))
- M16 (Change in abundance of indigenous plants and animals susceptible to introduced herbivores and carnivores)

8.2.4   Enhancing ecological networks

The work outlined in above has implications for WRC improving its current monitoring of terrestrial biodiversity. This work highlighted our ability to determine a range of ecosystem types currently existing within the Waihou-Piako Catchment. By extension, this work could be undertaken for the region as a whole. This would allow more specific and meaningful reporting on indicator a) above in terms of extent of the range of ecosystem types present in the Waikato. This then reflects a key part of the RPS objective. One immediate opportunity would be to intersect the finer habitat breakdown from Leathwick and LCDB4 and then undertake a comparison of LCDB4 against LCDB2 to give a 5 year time series on terrestrial habitat representation. This information would be useful to answer questions around ongoing loss of biodiversity, as well as what type of habitats are undergoing loss.

Another key aspect of this work is terrestrial ecosystem connectivity. The fragmentation indicator can examine whether connectivity between ranges of ecosystem types has been improved – i.e. the fragmentation index would reduce.

The combination of these two existing indicators could help measure part of the RPS objective. However, a significant gap remains in terms of measuring the ecological health and functions of terrestrial ecosystems across the region.

8.2.5 A standardised method for monitoring ecological health of terrestrial ecosystems

One of the options available is to develop a REMS-type approach for terrestrial ecosystem types. One advantage of setting up such an approach is that WRC has the expertise to inform it (Michael Pingram/Bruno David). It is likely that input would be required from Science and Strategy (ecological and environmental monitoring) and ICM (Integrated Catchment Services). It should also be noted that the REMS approach which has been operating for close to ten years has had considerable resource input from students (up to six) over the summer holiday period.

Step 1 – Sample location

Need to establish a network of sites for consistent sampling across an appropriate range of terrestrial ecosystem types. This design should be informed by the REMS approach[6] and be consistent with existing relevant national programmes. DOC for example, is using a randomisation methodology to select wetland monitoring sites and Greater Wellington are looking at using this method to identify sample locations for other terrestrial ecosystems.

Step 2 – Sample method

This would determine what would be monitored and how. For example, what metrics would be used to determine aspects of ecosystem function or species composition across a range of ecosystem types. Some possibilities have been discussed during the pilot phase and could include:

- Soil health – compaction; nutrient status; structure; moisture content; microbial community composition (utilising DNA barcoding); ecosystem metabolism (similar to the cotton strip assay used for monitoring biological activity in large rivers in development at WRC[7])

- Ecosystem health – a Traits Based Index (TBI) (similar to that used for monitoring estuarine health[8]);

- Wildlife – diversity and abundance of indigenous:
    - birds (5 minute bird counts)
    - herpetofauna (tracking tunnels)
    - invertebrates (pitfall and malaise traps)
    - fungi (utilising DNA barcoding)
    - bats (bat houses)

Some methods or metrics chosen will require development in collaboration with Crown Research Institutes (CRI's) and would require resourcing over time.

8.2.6 Links back to landowners, the community and citizen science

Motivating farmers to effect positive environmental change while minimising costs and identifying benefits to the farm business should be appealing. Soil is the economic and environmental keystone of the farming industry and so soil and its management would be an obvious focal point for monitoring. There are also strong links to riparian management and extension or enhancement of ecological linkages and the health of aquatic biodiversity.

Although soil management may appeal to farmers, it may not have the same general appeal to the community in general. Wildlife, and especially iconic or engaging species, tend to be more "sexy". Take for example the success of Hamilton Halo and the tui population. There is also the added benefit for the pilot area that the Kaimai Forum has as one of its key objectives "Bring back the birds". Regular

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[6] Which utilises reference sites for baseline monitoring, long-term sites for trend analysis, and probabilistic or random sites which are measured once every three years.

[7] See http://www.waikatoregion.govt.nz/PageFiles/9938/TR08-32.pdf for the first cotton strip assay trail in the Waikato River, 2008

[8] See http://www.waikatoregion.govt.nz/Environment/Environmental-information/Environmental-indicators/Coasts/Natural-character-and-biodiversity/co1-report/ for brief outline of the estuarine health TBI used at WRC

monitoring using bird counts could be built into part of the Forum's activities and/or linked to aspects of existing or potential enviro schools programmes or projects.

8.3   Aquatic indicators and targets

The REMS Programme provides a region-wide monitoring approach using standardised protocols. This provides state of the environment monitoring of fish (including koura), invertebrates, physical habitat, algae and water quality at 180 random sites across the region (and including within the pilot area). Sixty sites are visited each year and all sites are covered over a three year rotation. In addition there are 47 long term sites (two sites in pilot area) that are monitored more regularly to provide for trend monitoring to be established and reported. There are 24 reference sites (none in pilot area?) which are the baseline sites (high quality) and these are monitored annually. The sites in the pilot area are described in the table below and shown in Figure 15.

Group.Name	Site.Code	Site.Name
REMS Random Year Two	1122_96	Waihou River @ NZR08704-305
REMS Longterm	1158_7	Waimakariri Stm @ Off End of Waimakariri Rd
REMS Longterm	1174_10	Waiomou Stm @ Waiomou Rd
REMS Random Year One	2041_1	Onukutauira Stm @ NZR08704-097
REMS Random Year One	221_7	Kakahu Stm @ NZR08704-113
REMS Random Year Two	490_20	Mangawhero Stm (Matamata) @ NZR08704-225
REMS Random Year One	669_34	Oraka Stm @ NZR08704-065
REMS Random Year Two	669_36	Oraka Stm Trib @ NZR08704-241

There are no significant trends in ecological health at the two long term in the pilot area (see Figure 14). The macro invertebrate index (MCI) on the left generally sits in the "good" range (blue) for both sites relative to pristine areas (reference sites). The ASPM (the average score of three metrics) generally sits in the "good" range for Waimakariri and in the "fair to good" range for Waiomu relative to pristine areas. Poor = pink, Fair = orange, Good = blue, Excellent = green[9].

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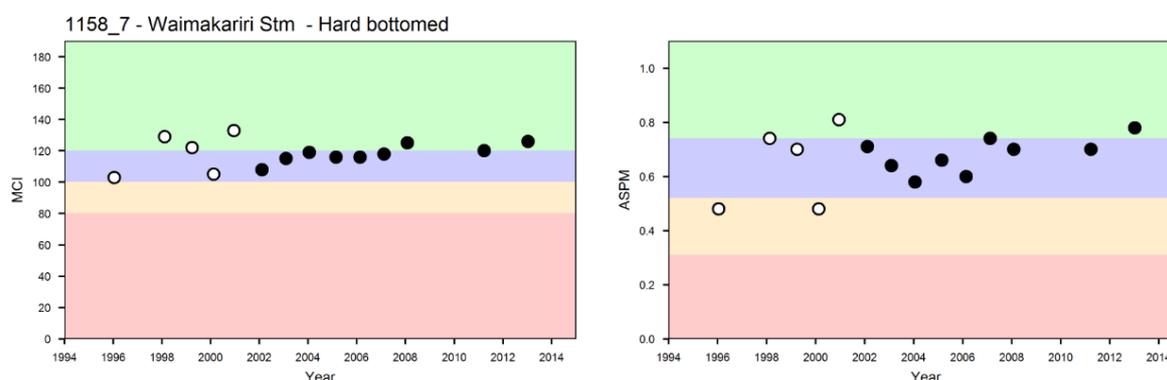
[9] A note on the classifications – according to Stark and Mexted, 2007 (Interpretation of MCI-type biotic indices) Excellent = clean water, good = doubtful quality or possible mild pollution, Fair = Probable moderate pollution, and Poor = Probable severe pollution.
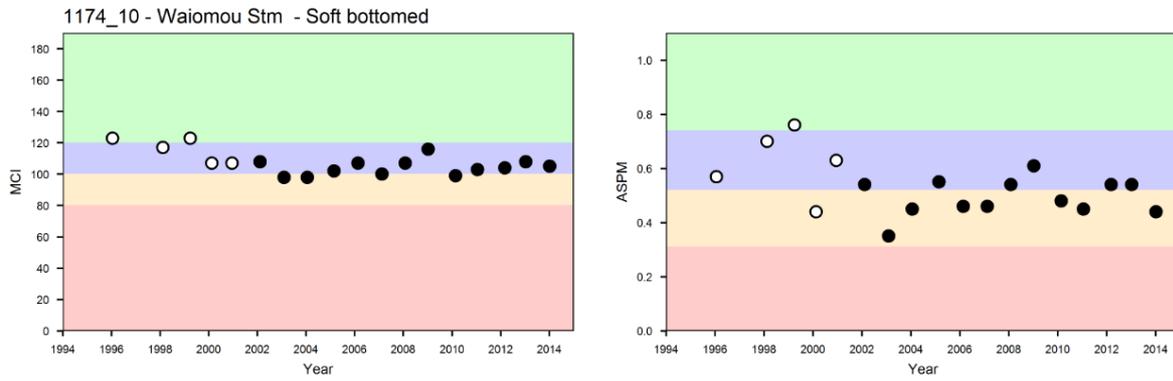
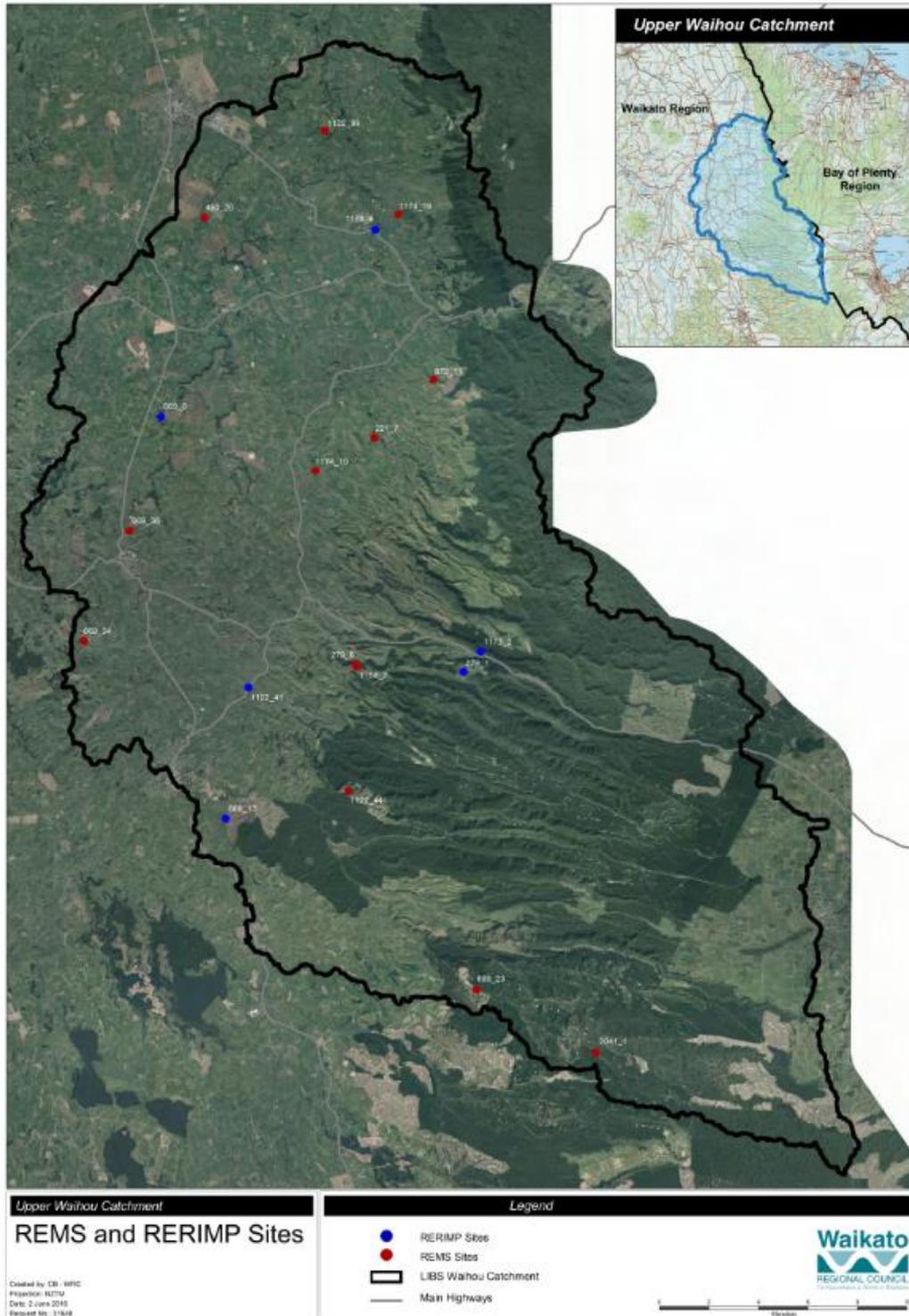**Figure 14:** Trends in ecological health for two streams within the pilot project area.

Figure 15: Map locations of REMS and RERIMP sites in the pilot area

State of the Environment monitoring for aquatic biodiversity (and water quality) provides the basis for reporting on indicators and for the development of targets. The system in place can be usefully linked to community monitoring and analysis, the use of citizen science and alignment with Mātauranga Māori if well designed and implemented. A significant opportunity exists to align the REMS monitoring approach with some key cultural indicators within the Ngati Hinerangi rohe linked to the proposed ecological restoration plan (see below).

8.4 Citizen science and Mātauranga Māori

For management of biodiversity to be sustainable over time (long-term delivery of work programmes) local people with a connection to the area need to be involved. Two key components linked to the monitoring framework and in-scope for the pilot were citizen science and Mātauranga Māori. The pilot attempted to assess how these could be incorporated into a robust monitoring framework. Both of these areas are part of existing WRC work programmes and the learnings from the pilot will have significant benefits. In discussion with Bruno David on the REMS programme, a potential two-step approach to monitor and measure aquatic ecological condition and integrity, consistent with data collection elsewhere in the region, was proposed. The proposed method could be applied by the community to achieve both monitoring outcomes as well as community engagement and input (citizen science/Mātauranga Māori outcomes).

Initially the approach suggested (below) could be tested specifically for the Ngati Hinerangi rohe, given the strong direction from them to look at developing an ecological restoration strategy linked to health and wellbeing of their waterways. A key caveat here is the currently limited capacity of WRC staff to engage, train and upskill local people therefore this would need to be planned carefully. The suggested approach provides an opportunity to demonstrate a practical application of both Mātauranga Māori and citizen science with good links to education, training, and mahinga kai.

1. For larger non-wadeable streams/rivers there is potential to use both primary production and the bacterial breakdown rates of organic matter as a means of assessing overall ecosystem health. For estimates of respiration and primary production dissolved oxygen loggers need to be deployed, as photosynthesis and respiration need to be measured over several days to determine stream metabolism and interpret results. For assessing the breakdown of organic matter, WRC is trialling the application of a standard substrate for estimating breakdown rates by micro-organisms (in this case cotton). WRC owns several dissolved oxygen loggers that could be deployed into the pilot area during appropriate times. WRC can potentially train people to deploy these, however they require specialist calibration and will likely require WRC staff to download and assess the results, as analysis can be complicated depending on the quality of the data collected. The use of these loggers would depend on their availability and staff capacity.

2. For wadeable streams/rivers there is potential to use two methods – electro fishing and Hinaki (Fyke nets). Training could be organised around electro fishing, but equipment is required – protocols require six fyke nets and 12 minnow traps – at a total cost around $1500. This is something we could potentially seek funding partners for to enable the marae to implement. We could use two indicators – 1) Eels as they represent connectivity and recruitment, and 2) Koura. Koura are non-migratory and not influenced by river connectivity like migratory fish are. Koura are also not commercially harvested from the wild like eels are. Set nets would be required at good and poor sites. Information and knowledge would be required on take areas and rahui (control or no take) areas, as well as any commercial take of eels going on in the location. The potential to designate recovery areas (protection) would also be useful. There is potential to run training on this at the marae and/or use the video developed by Bruno ([YouTube link](#)).

3. The additional possible option of deploying protocols based on the national guidelines on monitoring sediment. This would require deployment in a catchment without production forestry and a catchment with production forestry. The sediment guidelines are from a report by Cawthron Institute for MfE and is likely to be added to the National Objectives Framework (NOF) in the future. This is something we could potentially discuss with

Hancock's Forest Management to deploy monitoring in forested catchment as we develop relationships with them through the LIBS programme.

9 Where to from here?

A summary of this report will form the basis of a report to Council outlining the learnings of the pilot project and how these can be effectively integrated into the LIBS programme in year one. This report will also from the basis for the "How to Guide" to be developed as a key resource for territorial authorities to enable them to undertake LIBS-type processes into the future.

Remembering that the pilot project purpose was:

> *To test and share results of/learning from landowner and marae-based engagement, and ecological network modelling in order to demonstrate the benefits of taking a strategic and co-operative approach to biodiversity management in a timely manner that transitions effectively into the LIBS programme.*

The pilot project, despite its tight timeframe, has been successful in delivering a step-wise progression into phase two of the LIBS Programme, providing WRC and our TA partners' greater certainty in terms of funding requirements for the LIBS programme, and enabling more effective use of the resources set-aside to deliver it. Significant value has also been gained in a number of other areas:

1. The technical ability to delineate ecological networks based on habitat representation and connectivity and the transferability of this approach across the region;

2. Investment in identifying and setting up stakeholder relationships and gaining support from them for the process ahead;

3. Improved learning of how to engage with landowners and mana whenua;

4. Invested in building capacity and capability of our TA partners, mana whenua, landowners and other stakeholders;

5. Initiated a process to better co-ordinate the range of services currently being undertaken;

6. Added to our ability to implement more strategically.

Perhaps one of the most obvious benefits has been in the capacity building of our TA partners in terms of delivering on their biodiversity functions and with mana whenua through establishing a relationship with Ngati Hinerangi which can be formalised and operationalised as part of the LIBS programme. This is illustrated in the letters of support from SWDC, MPDC, and Ngati Hinerangi [see Appendix 5].

9.1 Scaling up the 'Source to Sea' approach

The upper Waihou Catchment has been the focus for the pilot project and it makes sense to focus on this area as part of year one of the LIBS programme, not least in terms of the expectations set up within this community and with the district council partners. Involvement of SWDC is confirmed. MPDC have signalled support for year one with a focus at a specific site basis and in terms of a rohe-based approach and relationship with Ngati Hinerangi. The relevance and importance of the LIBS approach to MPDC can then be reviewed and potentially additional resources sought to continue on and ramp up involvement in year two of the programme.

The marae and iwi trustees of Ngati Hinerangi have signalled their wish to formalise the agreement with WRC around the LIBS programme and the development of an ecological restoration strategy for their rohe. Any formal commitment should also consider MPDC as a partner. Ngati Hinerangi have also signalled that moving forward they would share their learnings around the marae-based approach to biodiversity management with other marae from adjoining Iwi, and hapu. This can be further discussed with them in year one of the programme, especially in terms of discussion with Raukawa and Ngati Haua.

To complete the Source to Sea approach, Hauraki District Council will also need to be engaged in the process at some stage. It is recommended that in year one, the findings from the pilot project are shared with Hauraki District Council, and their level of interest in being involved in year two of the programme is established.

The obvious first step is the sharing of the learnings of the pilot project and the development of the LIBS" How to Guide". This information can then be used to inform project planning for the LIBS programme going forward. Discussions will involve SWDC, MPDC, WRC, Ngati Hinerangi and Ngati Raukawa as part of the co-operative approach to LIBS programme planning.

9.2   Interest from Hamilton city

In addition to the above, Hamilton City Council (HCC) have joined with WRC to undertake a LIBS pilot approach for urban environments. This process started in December 2016, following initial project scoping in August 2016. Hamilton City have committed $50k in 2016/17 as their contribution to this pilot project.

Providing for a co-operative approach to biodiversity management in an urban context is an important component of testing the LIBS approach. The pilot and initial roll-out has tested the integration of biodiversity management within a largely rural, production landscape. Understanding what it takes to integrate biodiversity management within an urban context and how that compares with the rural context will be an important learning.

9.3   Thinking about programme delivery

One of the things that is becoming apparent as we have moved through the pilot phase is that overall co-ordination and oversight of a co-operative approach at a catchment (or zone) scale is crucial. How will this be managed and delivered moving through the LIBS programme? There are some existing models that can further assessed through year one of the programme for effectiveness and efficiency, skill requirements, and appropriate cultural context, but here are some options to consider:

- The transition from WRC-led to TA-led process. The rationale behind LIBS is to build the awareness, capacity and commitment from territorial authorities to undertake their biodiversity functions more effectively. This means a diminishing role (support) for WRC over time as this TA capacity builds.

- The internal transition from the Science and Strategy directorate to the service delivery/implementation parts of WRC. The LIBS programme is about setting up a framework for more effective and strategic delivery of biodiversity management. As the programme transitions over time the emphasis (and staff involvement) will likely shift from a stronger emphasis on policy/strategy to a stronger emphasis on implementation. The LIBS pilot learnings can inform the internal biodiversity roadmapcurrently being co-ordinated by ICM and provide recommendations to the next LTP, if required, to support service delivery requirements. This mechanism can also be used to assess and align WRC delivery projects and programmes based on the LIBS pilot learnings for example through pilot or demonstration projects, or through appropriate integration into catchment or zone plans or existing work programmes.

- The overall co-ordination and oversight of a co-operative approach at a catchment, district (or zone) scale is crucial as is the integration of soil, water and other outcomes to improve effectiveness. Some options to consider include:

  1. An ecological network co-ordinator at a catchment or zone scale. This could be based on the Waikato Biodiversity Forum model – a joint funded position by WRC, territorial authorities and the DOC Funding could be spread to include others such as industry.

  2. Adjustment of existing positions (e.g. look at role of the CMO as an integrating and co-ordinating role) linking in with other on-ground resources from WRC, territorial authorities and others (DOC, DairyNZ).

  3. A regional pool of on-farm ecologists co-ordinated from within WRC that share their services across the 10 territorial authorities within the region. Note that some territorial authorities (at least three) already have their own ecological expertise on staff.

4. Marae-based co-ordinators to enable a culturally appropriate framework to be set up and delivered. The Pare Kore model for waste management on marae is one option to consider and assess through year one of the programme.

9.4 Recommendations for moving into the LIBS programme

Moving into Year 1 of the LIBS programme it is suggested that WRC:

1. Support SWDC to undertake LIBS in the upper Waihou part of their district in year one (Source to the Sea) and involve Raukawa as key project partner.

2. Provide transitional support to SWDC to undertake LIBS approach for the remainder of their district in years two and three.

3. Support MPDC to undertake LIBS approach on a limited basis at specific sites and at a rohe level with Ngati Hinerangi in year one with a view to extending this across the district in years two to three (Source to the Sea).

4. Support HCC to undertake LIBS pilot approach for the city in the second half of year one.

5. Integrate and assess LIBS pilot learnings into other parts of WRC, especially ICM as part of biodiversity roadmap and Biosecurity Business Case.

6. Communicate with Hauraki District Council in year one around the LIBS approach and learning from the pilot project with a view to their inclusion into the programme in year two (Source to the Sea).

In year two the LIBS programme will be extended to include additional territorial authorities. Discussions have already commended with Waikato District Council around options for ecological network modelling and mapping for that district. The ability to support other territorial authorities by year three will be assessed to identify whether full regional coverage can be delivered by the end of 2018/19 or whether the funded LIBS programme will need to be extended for one (or more) years.

Appendix 1:   The LIBS pilot objectives

There are numerous objectives for the pilot project to support the goal, these are outlined below:

1) To develop a shared biodiversity vision with stakeholders, focus where we need to work with others and agree how to proceed to achieve improved biodiversity outcomes.

2) To establish proof of concept for spatial mapping of future state ecological network, establishing ecological baselines and developing associated monitoring framework.

3) To work with others to provide the wide variety of locally-relevant, socially acceptable and economically viable solutions to sustain biodiversity at sites within a co-ordinated network.

4) To capture and communicate existing good work and co-ordinate that work more effectively and develop and test new strategic and holistic approaches to biodiversity management.

5) To work with tangata whenua to provide a holistic approach to sustain indigenous biodiversity within ecological networks and maintain their relationship with it.

6) To strengthen the links with WRC service delivery by testing new approaches to biodiversity management that complement and add value to current integrated catchment management practices.

7) To highlight opportunities to add value and share resources, avoid duplication of management, and to identify any gaps.

8) To test grass-roots engagement and capacity building processes with landowners, tangata whenua, land managers and other key stakeholders.

9) To highlight and strengthen the education, training and research opportunities associated with a cohesive ecological restoration programme.

10) To establish best practice across the numerous ecological projects being undertaken and share this knowledge.

11) To act as a seed for funding by demonstrating that multiple benefits can accrue from a strategic and co-ordinated approach to biodiversity management.

12) To use WRC resources effectively by testing a model and incorporating successes and learning into scaled up projects.

13) To improve our understanding of the services and value that results from our biodiversity management.

14) To inspire others by developing stories that highlight how biodiversity management underpins people's wellbeing and acts as a catalyst for investment in local economies and communities.

Appendix 2: RPS method 11.1.11 local indigenous biodiversity strategies

WRC will assist territorial authorities to develop local indigenous biodiversity strategies. These strategies will be developed at a district scale and will:

    a. use the information produced under Methods 11.1.5 and 11.2.1

    b. establish indigenous biodiversity targets to enable local authorities to prioritise resourcing, track progress and monitor effectiveness in achieving indigenous biodiversity objectives

    c. identify:

        i. opportunities and priorities for re-creating habitat

        ii. opportunities and priorities for restoring, enhancing or re-creating buffers, linkages and corridors

        iii. important threats to indigenous biodiversity

    d. identify areas or sites:

        i. of indigenous biodiversity value

        ii. that may require protection

        iii. that may require enhancement

    e. involve working with tāngata whenua, affected landowners and resource managers, and other key stakeholders

    f. Assist in determining the regulatory and non-regulatory framework, including how territorial authorities will contribute to working towards achieving no net loss at a regional scale to maintain or enhance indigenous biodiversity.

Local authorities should have regard to these strategies when considering the most appropriate combination of regulatory and non-regulatory methods for each district.

Appendix 3:   Key RPS biodiversity objectives

3.8 Ecosystem services

The range of ecosystem services associated with natural resources are recognised and maintained or enhanced to enable their ongoing contribution to regional wellbeing.

3.9 Relationship of tāngata whenua with the environment

The relationship of tāngata whenua with the environment is recognised and provided for, including:

a)   the use and enjoyment of natural and physical resources in accordance with tikanga Māori, including mātauranga Māori

b)   the role of tāngata whenua as kaitiaki.

3.19 Ecological integrity and indigenous biodiversity

The **full range of ecosystem types**, their extent and the indigenous biodiversity that those ecosystems can support exist in a healthy and functional state.

Appendix 4: Tools matrix

Developing tools and removing barriers to biodiversity protection and restoration on private land

Lara Heppenstall and Annie Perkins – Groundwork Associates, Hamilton, NZ.

This study identified ways to catalyse biodiversity change at a community or regional level by interviewing the landowners who are impacted by these initiatives. The conversations with landowners identified a wide array of indirect tools that can be used by councils, community groups, and agencies to catalyse direct actions on the ground. The analysis also went a step further – to identify synergies and conflicts between tools, such as the synergistic biodiversity gains for wildlife when a mixed-native forestry section is alongside to a QEII covenanted block.

"[Agencies] should be sitting down with the landowner and saying, right, what do we need to [do to] preserve this asset? Are you [the landowner] prepared to put further resources of yours into it, and how can we match that to ensure we have the right outcome for the public into the future?"

- A Waikato farmer and conservationist

Enhancing biodiversity on private land
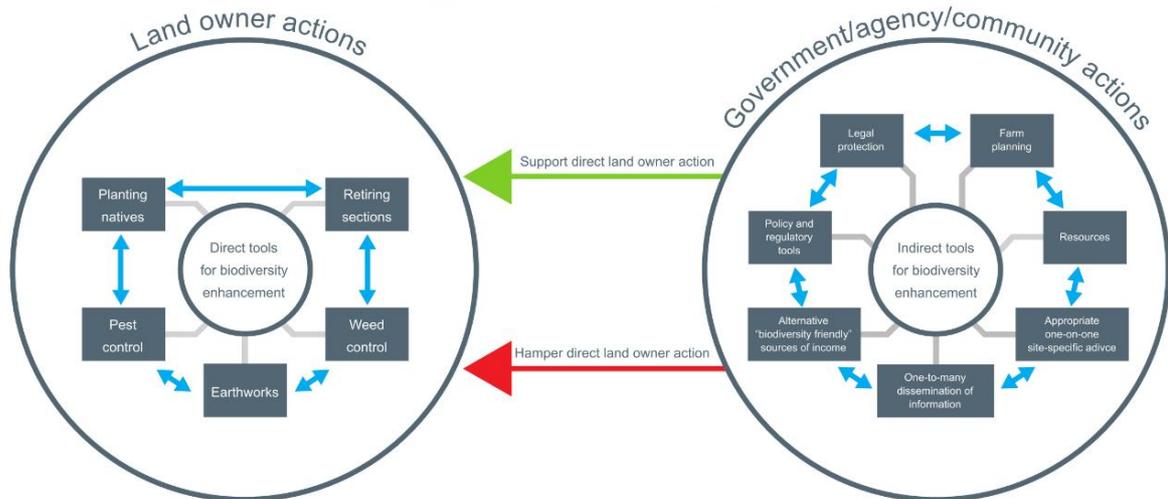
Notable synergies and conflicts between tools intended to enhance biodiversity on private land

Synergies
- Synergistic biodiversity gains for wildlife occur when a mixed-native forestry section is connected to another section that has been retired from farming, such as a QEII covenanted block.
- There are synergies when one-to-one advice is provided for landowners to support them in using farm planning tools to achieve both environmental and farming benefits:
  - "The more boxes you can tick when you're doing something, the more cost effective it can become."
  - "Every sub-catchment is different so you need different treatments".

Conflicts
- There can be a conflict between resource consents and making positive changes in land use:
  - "One problem we faced when doing this [biodiversity work] was our District Council required a change of land use consent, which was an unproductive process that cost us money and frustrated us a fair bit."
- Any perceived unfair enforcement by Councils (fines/prosecution) conflicts with voluntary environmental work landowners undertake with the Council (e.g. EPA and Covenants).

Key findings

The most significant findings of the interviews with landowners were:
- If done well, the farm planning process has the ability to achieve multiple objectives, both for the farm business and for the environment, and to remove red tape for landowners wanting to make a positive change in land use.
- One-to-one site-specific advice from knowledgeable people is extremely helpful to the landowner implementing biodiversity initiatives on the ground. The vast majority of landowners want to do the right thing, and appropriate, one-to-one advice at the right time will support them to see the success of their investment into biodiversity restoration or protection.
- Heavy-handed enforcement of rules, especially when a landowner is trying to make a positive change in land use, is extremely damaging to the relationship between the whole community and the council.
- The time efficiency and practicality of biodiversity initiatives are critical to rural landowners.

References and acknowledgements

This research drew from interviews with farmers, previous research conducted by Groundwork Associates, and consultations with other researchers doing related work, including:
- Fleur Maseyk, the Catalyst Group, Ph.D candidate at the University of Queensland
- Professor David Norton, University of Canterbury
- Dr. Marie Brown, Environmental Defence Society

This research was funded primarily by the Waikato Regional Council, as part of a larger WRC initiative (The Source to the Sea - Local Indigenous Biodiversity Strategy).

To learn more about this research head to our website:

#8925072

Appendix 5: Letters of support

Ngāti Hinerangi Trust

PO Box 20, Matamata
E: info.ngatihinerangiiwi@gmail.com
W: ngatihinerangiiwi.co.nz

Waikato Regional Council
Hamilton

To whom it may concern,

Re: Proposed Local Indigenous Biodiversity Strategy (LIBS) for Upper Waihou Catchment

We understand that the Waikato Regional Council is currently considering re-confirmation of the Long Term Plan funding to support the 3 year roll out of the LIBS Programme based on the learning developed through the Source to the Sea:Te Puna o Waihou ki Tikapa te Moana pilot project.

Ngāti Hinerangi has been involved as a partner in this pilot project, with Hinerangi Tawhaki Marae taking the lead on behalf of our other three marae, including Tangata, Te Ohaki and Tamapango Marae. Hinerangi Tawhaki Marae trustees provided a letter of support for the project and set up a team to lead that kaupapa on our behalf. This team included Dave Thompson and Jess Samuels.

At a hui with WRC staff from the pilot project team on 15th April, we provided a verbal endorsement to continue on with the LIBS kaupapa to the end of the pilot phase and beyond moving into the LIBS programme. We would like to re-iterate however that this endorsement is subject to the following:

1. Any ecological restoration strategy should focus clearly on the health of the tributaries linking to the Waihou.

2. Improved clarity and transparency around the structures set up to deliver on the pilot phase and transitioning into the post-pilot phase is required. We would like to develop a more formal mechanism built on the original letter of support (including a terms of reference) between Hinerangi Tawhaki, Ngāti Hinerangi Trust and WRC.

3. More involvement from the marae and iwi trustees in the engagement processes as a means to build capacity and build on existing skill sets within hapu and marae.

4. An additional engagement phase to assist inclusiveness and to improve the place-based nature of the mana whenua engagement and prospective responses (i.e. a method and process more specific to Ngāti Hinerangi). We note that the draft on-line survey discussed at the hui has been forwarded onto us by WRC for our feedback and that this is one of the mechanisms discussed to meet some of the requirements outlined above.

The marae of Ngāti Hinerangi look forward to continue working with WRC on the LIBS initiative. It is only through working together that we can maintain and enhance our indigenous biodiversity within our rohe and the region.

Nga mihi,

Philip Smith
Chairman
Ngāti Hinerangi Trust

7 June 2016

Waikato Regional Council
Private Bag 3038
Waikato Mail Centre
HAMILTON 3420

Attention: Matthew Vare

Dear Matthew

PROPOSED LOCAL INDIGENOUS BIODIVERSITY STRATEGY (LIBS) FOR SOUTH WAIKATO

I understand from you that the Waikato Regional Council is currently considering re-confirmation of its Long Term Plan (LTP) funding to support the 3 year LIBS programme roll-out with each of the other Councils in the Region. The South Waikato District Council wishes to strongly support the allocation of this funding in the WRC's LTP. Council considers that the LIBS programme is essential to fulfil its duties under Sections 30 and 31 of the RMA and under the newly-operative Waikato Regional Policy Statement (WRPS) to maintain or enhance indigenous biological diversity.

As you know, Council was actively involved in the development of the consensus that is now codified in the WRPS that the WRC and the other Councils in the Region would develop Implementation Agreements outlining how and when they would work together to achieve the specific objectives of the WRPS. Council views the development of an LIBS for the South Waikato as a crucial component of its forthcoming Implementation Agreement with the WRC.

The importance of the LIBS was further outlined by the WRC's submissions on the Proposed South Waikato District Plan. The Regional Council correctly pointed out that while the District Plan provided protection for over 300 bush remnants and wetlands that met the WRPS criteria to be "Significant Natural Areas", the Plan lacked a focus on maintaining or enhancing indigenous biodiversity in areas that did not qualify as significant. Options for providing this focus were thoroughly discussed by the Councils and other interested parties, and advice was obtained from Council's ecological consultants. It was agreed that preparing a LIBS was the appropriate solution, and this agreement was formalised by an Environment Court consent order. The consent order amended the District Plan by adding the following:

> "A Local Indigenous Biodiversity Strategy will be developed using this information and aiming to maintain and enhance indigenous biological diversity in the South Waikato, including Significant Natural Areas (SNAs) as well as areas of indigenous vegetation and habitats of indigenous fauna that do not qualify as significant.
> This Strategy will adopt a catchment-based approach to address the following:
> 1. Protection and enhancement of waterways - the strategy will use the river and stream network as the fundamental framework for biodiversity planning, implementation and long term management.
> 2. Ecological connectivity across the District.
> 3. Physical protection and enhancement of SNA's and their place in an 'ecological network' across the District.

the South Waikato ... discover it ... live it ... love it ...

4. Key implementation methods to achieve an integrated approach using regulatory (where relevant) and non-regulatory methods

Development of the Local Indigenous Biodiversity Strategy will commence before 31 December 2016".

Council has now included an additional $45,000 in its LTP to support the development of a LIBS for the South Waikato, in accordance with our District Plan implementation programme and Regional Policy Statement obligations. The level of funding allocated was as agreed with WRC staff in September 2014, and aimed to align with prospective WRC funding and available staff resources. In addition to relying on our internal planning staff time, Council anticipates also relying on Regional Council policy staff, ecologist and GIS expertise in this regard.

The proposed funding that SWDC has allocated is as follows:

2016/17	$20,000
2017/18	$15,000
2018/19	$10,000

The Upper Waihou LIBS Pilot Project, which has nearly concluded, will give both organisations greater certainty in terms of funding requirements.

Council is very committed to providing ongoing support to maintain or enhance biodiversity. Some of our initiatives were outlined in the presentation by Council's Environmental Projects Officer, Andrew Thomas to stakeholders at the recent Upper Waihou LIBS Pilot Project Forum. These initiatives include:

- Mokaihaha Kokako Recovery Project
- South Waikato Environmental Initiatives (SWEI) Fund – administration & promotion
- Enviroschools - funding support
- Ecological & Heritage Protection Fund
- Waikato biodiversity forum - funding support
- Reserve management plans
- Rates remission for voluntarily covenanted land
- The development of a co management plan with Raukawa for Te Waihou and the Blue Spring. Some extra funding has been allocated for this project, but Council will also be relying on WRC expertise re. water quality and ecological support etc.

The South Waikato District Council looks forward to continuing to work with the Regional Council on the LIBS initiative, and considers it imperative that the WRC allocates funding in its LTP for this co-operation to occur over the next three years, and commence as soon as possible. It is only through the Councils working together with mana whenua groups, landowners and environmental organisations that we can hope to halt the decline of indigenous biodiversity in the Region.

Please do not hesitate to contact me if any further clarification or information is required.

Yours sincerely

Sharon Robinson
GROUP MANAGER REGULATORY

Our ref: 11481
Your ref:
Enquiries to: Dennis Bellamy

matamata piako
district council

30 June 2016

Waikato Regional Council
Private Bag 3038
Waikato Mail Centre
Hamilton 3240

Attention Matthew Vare - Matthew.Vare@waikatoregion.govt.nz

Dear Matthew

Local Indigenous Biodiversity Strategy (LIBS)

I understand that you are in the process of evaluating the LIBS programme and its continued funding support from the partner Councils. Matamata-Piako District Council has not identified any particular funding for this programme in its Long Term Plan, but has continued with a number of funding streams that could be used to support the Indigenous Biodiversity Strategy.

As you are aware we are also working with the Regional Council in developing 'Implementation Agreements' to achieve the objectives of the recently adopted Regional Policy Statement. Regional Council programmes such as support for LIBS could be documented in this agreement as a way forward.

Council has however identified the following funding streams in the 2016-19 LTP that could be used to provide this support:
- Funding support for significant natural features ($15,000/year)
- Community grants - $5,000 per ward ($15,000/year)
- Financial support for the management/development of various reserves - Centennial/Tom Grant Drives ($1,500/year), Te Miro mountain bike club ($7,500)
- Enviroschool ($10,000/year)
- On-going annual applications for grants through the Annual Plan process.

Applications from landowners, mana whenua groups and environmental organisations can be directed towards any one of these funds that may be appropriate to the local indigenous biodiversity project. Council can also reassess any further funding as a contribution to any programmes underway at the 2016/17 Annual Plan round.

Mayor Jan Barnes has also had discussions with various groups within the community, looking at a site-based approach to improving indigenous biodiversity with groups such as the Te Poi Primary School, linking in with Ngati Hinerangi as part of the ecological restoration strategy for their rohe and restoring areas like the Hawes Bush Reserve in Waharoa. These groups are looking to partner with Council and others to regenerate these existing areas of biodiversity. This interest needs to be fostered and supported in order to reverse the decline in indigenous biodiversity within our district.

Telarc.
Registered

Quality
ISO 9001

Matamata-Piako District Council looks forward to working with the Regional Council and other partners on the LIBS programme. Funding support from the Waikato Regional Council, allocated through its LTP, is critical for the co-operation between all partners to continue and to achieve good results in indigenous biodiversity regeneration within the region.

Please don't hesitate to contact me if any further clarification or information is required.

Regards,

Dennis Bellamy
Group Manager Community Development

Appendix 6: MOU between WRC and Greenfleet

MEMORANDUM OF UNDERSTANDING

Between

WAIKATO REGIONAL COUNCIL

and

GREENFLEET

1. Preamble and Recitals

1.1. Waikato Regional Council recognises that working together toward common goals is vital for a successful region. This is reflected in our mission to: *work with others to build a Waikato region that has a healthy environment, a strong economy and vibrant communities.*

The effects of climate change may impact our ability to provide for our wellbeing, including health and safety. Over the next 30 years, the Waikato could face changes to its temperature and rainfall, have more frequent storms and sea level could rise. We can also expect challenges in managing our indigenous biodiversity, including new biosecurity threats.

The way that we develop and care for our natural resources, including the effective co-management of these resources with tangata whenua, will play an important part in addressing these environmental challenges.

1.2. Greenfleet is Australia's largest not-for-profit proponent of carbon forestry projects with over 8.5 million trees planted on 450 sites across Australia since 1997. Greenfleet plants biodiverse carbon forests on behalf of its supporters that elect to voluntarily offset part or all of their greenhouse gas emissions.

Greenfleet's philosophy for tackling climate change involves three key phases:

1. avoid creating emissions wherever possible;
2. reduce the rate at which you do create emissions; and
3. offset any emissions created by recapturing CO2 from the atmosphere.

Greenfleet is expanding operations into New Zealand and is looking for key partnerships with influential organisations.

2. Objectives of Memorandum

2.1. This Memorandum is intended to:

a) establish a framework for communication, cooperation and partnership between Waikato Regional Council and Greenfleet to assist one another in areas of mutual interest;

b) facilitate consultation between Waikato Regional Council and Greenfleet with opportunities for input in areas of mutual interest and concern; and

c) provide opportunities for future cooperative projects between Waikato Regional Council and Greenfleet, initially focussed on the Local Indigenous Biodiversity Strategy (LIBS) Programme[1].

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[1] The LIBS programme is being tested via a pilot project in the Upper Waihou catchment called Source2Sea:Te Puna o Waihou ki Tikapa te Moana.

3. Working arrangements

From time to time the parties shall use their best endeavours to give effect to the objectives of this Memorandum by:

3.1. Working together on common issues between Waikato Regional Council and Greenfleet in a manner that promotes:

   a) timely and professional dealings with each other;

   b) early communications with respect to issues of real or anticipated concern;

   c) acceding to requests for information where appropriate; and

   d) better understanding of the values and motivations of each party.

3.2. Communicating on common issues between Waikato Regional Council and Greenfleet including:

   a) Council staff and nominated representatives (as identified in the appendix or as updated from time to time) engaging in ongoing consultation, information sharing and discussion of issues; and

   b) representatives from each organisation communicating and meeting to resolve broader issues and discuss cooperative projects and programs.

3.3. Collaborative projects will aim to achieve outcomes for mutual benefit including:

   a) the creation of biodiverse forests and revegetation of landscape;

   b) reduced salinity and erosion;

   c) improved water quality in rivers and streams;

   d) the provision of habitat for native wildlife;

   e) improved structural and functional connectivity of habitats; and

   f) maintenance of the relationship that tangata whenua have with indigenous biodiversity.

3.4. Annual Schedule of Works

   An annual schedule of works is to be jointly developed by the parties and is to include:

   a) identification of sites suitable for revegetation within the context of the LIBS pilot and Programme,

   b) agreement by <insert month> of each year to direct the plantings of the upcoming financial year to allow adequate time for potential resource allocation, site preparation and development of Site Revegetation Agreements (see 3.5); and,

   c) agreed to by Greenfleet representative and the responsible Council Manager or delegate.

3.5. Site Revegetation Agreement

   Individual Site Revegetation Agreements will be jointly developed and signed by both parties prior to the commencement of each revegetation project. The agreements will outline the agreed contributions to the on-ground delivery of the partnership, including any resources and are to ensure the objectives and milestones for each site are clearly identified and agreed to by both parties.

a) Site Revegetation Agreements will be jointly signed and agreed to by a Waikato Regional Council representative and Greenfleet to ensure commitments can be met within the delivery and resource capacity of each party at the local level.

b) The restoration objectives or conservation outcomes for each site are clearly articulated including:
   a. ensuring biodiverse revegetation aligned with local Ecological Vegetation Class (EVC) floristic descriptions.
   b. providence of genetic material collected for propagation and revegetation.
   c. density of plantings aiming to align with EVC benchmark criteria.

c) Waikato Regional Council commitments such as site preparation, site protection and site maintenance.

d) Greenfleet commitments such as site preparation, planting, monitoring, maintenance and remediation.

e) Each Site Revegetation Agreement is to include a suite of measures that each party commits to achieving at each site. These measures may include percentage canopy cover, average stem density per hectare, average tree height and species diversity. Once these measures are met, commitments to the Site Revegetation Agreement are to be considered completed.

3.6. Research and training

The parties shall cooperate in facilitating opportunities for conducting and funding research, joint conservation and training programs, and promotional projects including;

a) community and corporate planting activities;

b) measuring, monitoring and modelling of carbon stores; and

c) engagement with Maori through specific marae-based or youth (Rangatahi) based training and employment programmes.

3.7. Media, promotion and community engagement

Both parties agree, where appropriate, to partner each other in the use of appropriate media to promote and develop their mutual interest. Media, promotional and community engagement opportunities (this includes corporate planting days, volunteer and community planting days) are to be identified in the Annual Schedule of Works and Site Revegetation Agreements.

a) All agreed programs/projects to be jointly badged in all media and promotional material.

b) Waikato Regional Council to approve all media and promotion materials that include its logo or its name.

3.8. Grants, sponsorship and external funding

The parties agree to work together to identify and cooperatively apply for funds from other sources for joint ventures, cooperative projects, joint research and training programs. This may include working strategically across the funding landscape to develop an integrated funding approach which leverages inter-agency and corporate funding across all four wellbeings (environmental, cultural, economic, and social) but aligned to ecological restoration.

3.9. Carbon Sequestration

Waikato Regional Council acknowledges Greenfleet's requirement for ownership of sequestered carbon from projects conducted under this Memorandum. The parties acknowledge:

a) That Greenfleet requires the registration of an Encumbrance Instrument (EI) on the title of the planted land

4. General

4.1 The parties to this Memorandum acknowledge that it is does not and is not intended to create any legally binding obligations on the parties and does not of itself constitute a policy statement. The purpose of this Memorandum is to assist the parties to maintain and improve their relationship.

4.2 This Memorandum is neither a fiscal nor a funds obligation document. Nothing in this Memorandum shall oblige either of the parties to expend funds or to enter into any future site revegetation agreement, contract, supplemental agreement, or obligation with the other.

4.3 This Memorandum in no way restricts the parties from participating with other public or private agencies, organisations, and individuals on similar agreements. The parties recognise the importance of cooperation and partnership with other organisations and institutions regarding their mutual interests.

4.4 The parties acknowledge that cooperative ventures between Waikato Regional Council and Greenfleet may affect other stakeholders. It is also recognised that cooperative ventures between Waikato Regional Council and other stakeholders may affect Greenfleet and its members.

4.5 When such impacts become evident to either party to this Memorandum, they will consult with the aim of facilitating agreement between the parties and affected stakeholders.

4.6 It is recognised by the parties that not all matters will be able to be agreed and the parties may resolve not to agree.

4.7 Attempts to resolve disagreements and disputes arising out of the Memorandum will be undertaken unanimously and where resolution cannot be achieved the matter will remain open for discussion to enable the parties to find an acceptable outcome.

4.8 With respect to local issues the parties recognises that many local issues can and should be resolved with the regional representatives and in the event of a dispute the matter is to be referred to the committee of nominated representatives to facilitate resolution.

4.9 The term of this Memorandum of Understanding is four years and shall be reviewed each 12 months after the date of execution at the election of either party, or as otherwise agreed.

4.10 This Memorandum may be modified in writing by prior agreement of both parties.

4.11 This Memorandum may be terminated in writing by either party.

Effective date

This Memorandum becomes effective upon execution by representatives of the parties and remains in effect until modified, terminated or at four (4) years from agreement.

Signed on behalf of *Waikato Regional Council* by its authorised officer

_____ Date _____

Signed on behalf of Greenfleet by

_____ Date _____
Rob Small

#3730900

Glossary

AIP	Agreement in principle
CMO	Catchment Management Officer
CRI	Crown Research Institute
DOC	Department of Conservation
EBIDTA	Earnings before interest, depreciation, taxes and amortization
EIF	Environmental Initiatives Fund
EPA	Environmental Programme Agreement
ERMA	Environmental Response Management Application
ES	Ecosystem Services
GHG	Green House Gases
GIS	Geographic Information Systems
HCC	Hamilton City Council
ICM	Integrated Catchment Management
ICW	Integrated Construction Wetlands
INFORM	Integrated Farm Optimisation and Resource Allocation Model
LCBD	Land Cover Database
LIBS	Local Indigenous Biodiversity Programme
LTP	Long Term Plan
LUC	Land Use Capability System
MBIE	Ministry of Business, Information and Education
MfE	Ministry for Environment
MOU	Memorandum of understanding
MPDC	Matamata Piako District Council
MPI	Ministry for Primary Industries
MRP	Mighty River Power
MSD	Ministry of Social Development
NC	Natural Capital
NOF	National Objectives Framework
NSC	National Science Challenge
NWR	Nga Whenua Rahui
REMS	Regional Ecological Monitoring of Streams
RPS	Regional Policy Statement
SNA	Significant natural area
SWDC	South Waikato District Council
TA	Territorial Authorities
TPK	Te Puni Kokiri
WINZ	Work and Income New Zealand
WRC	Waikato Regional Council
WWF	World Wide Fund for nature